Woodward-Clyde Consultants

November 25, 1992

Mr. Jerry Banks
Mississippi Office of Pollution Control
P.O. Box 10385
Jackson, Mississippi 39289-0385

RE: Equalization Basin Closure Plan
Randall Textron, Inc.
Grenada, Mississippi
WCC Project No. 92J342C

Dear Mr. Banks:

Please find enclosed the revised closure plan for the equalization basin at the Randall Textron facility located at Grenada, Mississippi. The revised closure plan is submitted on Randall Textron's behalf in response to the Mississippi Department of Environmental Quality's letter dated October 29, 1992.

If you have any questions, please call Mr. Mark Williams of Randall Textron at (513) 896-3824.

Very truly yours,

P. Ravi Kumar

Ravi K. Penmetsa
Staff Engineer

Caleb H. Dana, Jr.

Caleb H. Dana, Jr., P.E., CHMM
Associate

cc: Mr. Mark Williams, Randall Textron
Mr. Jack Schiavone, Randall Textron
Ms. Rhonda York, Randall Textron

FINAL REPORT

[redacted] EQUALIZATION LAGOON CLOSURE AND POST CLOSURE PLAN

Prepared for
Randall Textron
Grenada, Mississippi
November 1992

Woodward-Clyde

460 Briarwood Drive
Suite 520
Jackson, MS 39206

EQUALIZATION LAGOON
CLOSURE AND POST-CLOSURE PLAN
RANDALL TEXTRON
GRENADA, MISSISSIPPI
EPA FACILITY ID NO. 007037278

Prepared for:

Randall Textron
Highway 332 East
Grenada, Mississippi

Prepared by:

Woodward-Clyde Consultants
460 Briarwood Drive, Suite 520
Jackson, Mississippi 39206

November 25, 1992

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1.0
INTRODUCTION

This closure plan has been prepared for an equalization lagoon used by Randall Textron at the Grenada, Mississippi facility. The closure plan has been prepared based on the Mississippi Department of Environmental Quality, Office of Pollution Control (MDEQ) regulations governing the closure of hazardous waste units. Regulations that pertain to the closure are Mississippi Hazardous Waste Management Regulations (MHWMR) Subpart G -Closure and Post-Closure of Parts 264 and 265. A checklist of closure plan requirements outlined in MHWMR 264 and 265 is presented in Appendix A.

Randall Textron manufactures wheel covers for the automobile industry. Manufacturing activities include parts stamping, rolling, washing, polishing, electroplating and painting. The electroplating is a chrome plating operation. Various wastewaters are generated from the washing and electroplating operations, as well as other facility activities. These include a chromium plating wastewater, mild alkaline rinsewaters, boiler blowdown, and roll forming department wastewater. These wastewater streams, along with stormwater from several areas of the facility were discharged to the equalization lagoon. The chromium electroplating wastewater first entered a chrome reduction unit to reduce hexavalent chromium to trivalent chromium prior to discharge to the lagoon.

The closure plan is being submitted in response to Item 2.F. of the Mississippi Commission on Environmental Quality administrative order No. 2012-91 issued on March 19, 1991. Item 2.F. requires Randall Textron to submit closure and post closure plans for the equalization lagoon as required by MHWMR Parts 264 and 265 Subpart G within 180 days of installation of the groundwater monitoring system. The groundwater system was installed on March 24, 1991. Other items in the order related to closure include items 2.B. and 2.E. Item 2.B. required compliance with MHWMR Part 265 Subparts A, B, C, D, E, and H. by June 1, 1991. The requirements of Subpart H regarding financial assurance for closure and post-closure were reported to MDEQ as complied with by letter dated April 24, 1991 from Randall Textron. Item 2.E. required preparation and implementation of a groundwater monitoring plan in

compliance with Parts 264 and 265 Subpart F. This requirement was met and related groundwater information is included with this closure plan (Appendix B).

The closure strategy is to achieve clean closure. The equalization lagoon was utilized to hold and mix various electroplating washes, rinses, and wastewaters. MDEQ has designated the influent wastewater stream to the lagoon as D007 and F006 hazardous wastes. Effluent from the equalization lagoon was pumped to the facility wastewater treatment plant and discharged under an NPDES permit. Sludge in the lagoon may have accumulated chromium above RCRA clean closure action levels. Based on the knowledge of the past and current facility operations and information provided in the groundwater report (Appendix B), it is currently assumed that constituents detected in the groundwater have not been contributed by the operation of the equalization lagoon and therefore should not preclude clean closure. Closure will be accomplished by characterizing the extent of sludge and subsoil beneath the lagoon that may require removal or treatment, implementation of removal/treatment, and backfilling to naturally occurring elevations at the site. Removed materials will be treated and disposed of in accordance with RCRA regulations and landban requirements.

The closure objectives are:

- Removal of all hazardous wastes from the unit.
- Decontamination of all associated equipment.
- Removal of waste sludge or subsoils so that remaining subsoils do not exhibit constituent concentrations above the Toxicity Characteristic Leaching Procedure (TCLP) regulatory standard, or do not exceed naturally occurring background levels.
- Removal of waste sludge or subsoils so that remaining subsoil constituents are below health-based levels (based on proposed RCRA 264 Subpart S soil criteria) and will not leach to groundwater in concentrations that will exceed the maximum contaminant level (MCL) or proposed Subpart S groundwater criteria where there is no MCL.

- Demonstration that no groundwater contamination exists that is a result of use of the management unit.

2.0
SITE CONDITIONS

2.1 SITE DESCRIPTION

2.1.1 Environmental Setting

The Randall Textron facility is located at Highway 332 East, Grenada, Mississippi, approximately 1.1 miles north of Grenada city limits (Figure 1). The topographic location is Latitude 33^0 48' 16" and Longitude 89^0 47' 30". The areas immediately west, south, and east of the facility are wetland or rural areas. An Illinois Central and Gulf (IC&G) railroad line crosses the northern and eastern portions of the site. Further to the north, beyond the rail line, a subdivision of approximately 50 homes exists. Surface water from the Randall Textron facility site enters the Riverdale Creek which then flows into the Yalobusha River approximately 1 mile downstream.

2.1.2 Waste Unit Location

The equalization lagoon is located on the north side of the manufacturing facility building (Figure 2.) The IC&G Railroad flanks the northern side of the lagoon and Mississippi Highway No 332 the western side.

2.2 WASTE STREAM DESCRIPTION

The manufacturing facility was built by Lyons, Inc., in 1960 at which time the equalization basin was placed into operation. North American Rockwell (Rockwell International) purchased the site in 1966. In July of 1985 Randall Textron purchased the facility. Wastewater influent to the equalization lagoon remained essentially the same until July 20, 1990, at which time the wastewater from the chromium electroplating, roll department, and boiler were taken off-line and sent directly to the wastewater treatment facility. Prior to diversion, approximately 360,000 gallons per day of combined wastewater and rainwater were discharged to the lagoon. Of the process flow, approximately 7 % or 25,000 gallons per day were discharged from the chrome

electroplating unit. The equalization lagoon was designed for a maximum flow of 500,000 gallons per day. Wastewater streams which discharged to the lagoon included:

SOURCE	FLOW (gpd)
Roll Department	40,000
Boilers	8,000
Chrome Electroplating	25,000
Boil-Off	27,000
Butler Wash	120,000
Buff Wash	140,000
Stormwater	Unknown

(In July of 1991, all wastewater flows to the lagoon were diverted directly to the wastewater treatment system. Subsequently, the lagoon was dewatered by treating the lagoon effluent in the wastewater treatment system. No flow currently enters the lagoon except for some stormwater runoff. From recent observation of the lagoon it is assumed that a thin layer of water covers the bottom sludge layer.)

2.3 EQUALIZATION LAGOON DESCRIPTION

According to available drawings dated November 7, 1977, the lagoon's dimensions were approximately 525 x 225 x 10 feet. Although definitive records do not exist, the bottom liner of the lagoon may consist of approximately 4 to 5 feet of clay material. The maximum volume of water and thus the maximum amount of waste that the lagoon can hold is approximately 2,500,000gallons of liquid. At the time of construction there were seven pipes leading into the lagoon with two additional effluent pipes, one serving as the discharge line to the wastewater treatment wet well and one as the overflow outfall line.

2.4 LITHOLOGIC AND GROUNDWATER CHARACTERIZATION

2.4.1 Site Geology

Randall Textron had soil borings installed adjacent to the equalization lagoon in December 1991 and March 1992. Site geology, as reported in the soil borings, indicates subsurface soils consisting of clay, silt, and sand. Five borings were installed adjacent to the lagoon. The lithologic descriptions indicate that clayey or silty soils exist at the surface down to 5 feet to 16 feet below land surface (bls). Fine to medium grained sand exists below this to a depth of 20 feet bls at which depth the borings were terminated.

2.4.2 Site Hydrogeology

Groundwater was determined to occur approximately ten feet bls. The groundwater flow was measured periodically and the flow direction in the vicinity of the lagoon is to the northwest. The groundwater gradient is approximately 0.5 feet across the lagoon.

2.4.3 Groundwater Quality

Five groundwater monitoring wells were installed around the equalization lagoon in December 1991 and March 1992. Since then, the wells have been sampled monthly, with available data through June of 1992 used for the preparation of this closure plan. The groundwater was sampled for drinking water quality, groundwater quality, volatile organic compounds, contamination indicators and metals. The analysis revealed that the concentration of two constituents, total chromium and trichloroethene (TCE), exceeded acceptable limits. Total chromium was detected at a range of 0.010 ppm to 85 ppm and TCE at a range of 0.087 ppm to 130 ppm. The complete groundwater report is enclosed in Appendix B.

Two of the five wells have shown a significant level of total chromium above the Maximum Contaminant Level (MCL) of 0.1 ppm. Two of the wells, located south of the lagoon, are upgradient of the lagoon based on the natural groundwater flow direction. The wells immediately downgradient of the lagoon show total chromium levels that are

below the MCL. This leads to the conclusion that the source of total chromium in the groundwater is not the equalization lagoon.

Trichloroethene (TCE) was also detected in the groundwater. The MCL for TCE is 0.005 ppm. All the monitoring wells at the present time have levels of TCE that exceed the MCL, including the wells upgradient of the lagoon. The higher levels of TCE were detected in the two wells that had the higher levels of total chromium. There is no historical evidence that TCE was ever included as a significant component of the wastewater flows to the lagoon leading to the earlier statement that the groundwater is potentially not affected by leaching from the equalization lagoon.

These results indicate that there could potentially be another source of contaminants at the facility that needs investigation. Groundwater investigations are currently ongoing for this purpose. Additional groundwater monitoring wells will be installed in selected areas to detect releases from other possible sources. These investigations into the other sources of groundwater contamination should not preclude clean closure of the equalization lagoon.

3.0
PRE-CLOSURE SITE CHARACTERIZATION

3.1 SLUDGE AND SUBSOIL CHARACTERIZATION

Prior to closure of the equalization lagoon, lagoon sludge and subsoils must be characterized to determine the extent of material removal necessary. A secondary objective is the determination of the feasibility of pursuing clean closure. The criteria identified in Section 3.4 will be the basis for determining the vertical extent of the chemicals of concern that must be removed in closing the lagoon. The sludge and subsoil will be sampled for the following analytical parameters: TCLP test for chromium and total analysis of selected Appendix VIII constituents. Twelve sampling locations are shown on Figure 3. A total of 20 samples will be collected. Samples will be collected as illustrated on Figure 3 and shown in the table below.

Type of sample as indicated on Figure 3	Matrix sampled	Sample collected at depth (ft)	Chemical analysis
Type I	Sludge	Composite sample from the vertical column of the sludge above the interface with the subsoil.	TCLP test for total chromium.
Type II	Sludge	Composite sample from the vertical column of the sludge above the interface with the subsoil.	Total analysis of Appendix VIII constituents. TCLP test for total chromium.

Type of sample as indicated on Figure 3	Matrix sampled	Sample collected at depth (ft)	Chemical analysis
Type II	Subsoil layer 1	Discrete sample one foot below the interface of the sludge and the subsoil.	TCLP test for total chromium.
Type II	Subsoil layer 2	Discrete sample at or near the water table or the base of clay whichever is encountered first.	TCLP of detected Appendix VIII constituents.

Type II characterization of subsoil layer 2 will be conducted for constituents that were detected in the total analysis of Type II sludge. Apart from the chemical analysis of the lagoon, the geology of the subsurface soils in the lagoon will be logged at all Type II locations. The limit of such profile will be the sampling depth reached during characterization of subsoil layer 2. The objective of the geologic profile is to determine the thickness of the sludge, the bottom liner if any, and the depth to the groundwater. Additional sampling and analyses will be performed for closure purposes as described in subsequent sections. A survey will be performed to profile the lagoon.

3.2 GROUNDWATER CHARACTERIZATION

For the purpose of a clean closure equivalency demonstration, additional groundwater sampling may be necessary.

3.3 BACKGROUND SOIL CHARACTERIZATION

Two background soil samples will be collected from the subsurface. The exact sample locations will be determined in the field to allow flexibility for equipment access. The two samples will be composited and analyzed for total and TCLP analysis of chromium and detected constituents of Appendix VIII. These samples will be collected at least five feet bls and above the water table.

3.4 CLEAN CLOSURE TARGET CONCENTRATIONS

Clean closure target concentrations are based on compliance with 40 MHWMR 270.1(c) which requires closure to be equivalent to Part 264 Subpart G closure by removal requirements. The requirements for clean closure include establishing concentration limits which are:

- below health-based criteria for upper three feet of soil (proposed Part 264 Subpart S criteria for soil).
- below background concentrations for the upper three feet of soil for constituents without health-based criteria.
- less than the TCLP concentrations for soils.
- below levels in the subsoil which would leach to groundwater at levels above the Maximum Contaminant Level (MCL).
- below the MCL or health-based criteria (proposed Subpart S groundwater criteria) for groundwater.

4.0
SCOPE OF WORK

4.1 CLOSURE OBJECTIVES

Randall Textron's objective for this closure plan is to achieve clean closure of the equalization lagoon. Randall Textron intends to begin preclosure activities as soon as this closure plan is approved by the state agency.

The equalization lagoon will be closed using the following procedures:

- Remove and dewater the lagoon sludge.
- Remove any contaminated subsoil which fails the clean closure target concentrations identified in Section 3.4.
- Transport the dewatered sludge and contaminated subsoil material to a permitted hazardous waste disposal facility.
- Treat the liquids in the on-site wastewater treatment system.
- Backfill the lagoon with native soil from the area, cover with topsoil and seed.

4.2 OVERVIEW OF REMEDIATION APPROACH

Randall Textron will close the equalization lagoon by implementing the seven major steps listed below:

- Sludge and subsoil characterization
- Final selection of closure method
- Site preparation

- Sludge and subsoil removal
- Clean closure verification
- Backfill lagoon
- Closure certification

For the preparation of this closure plan, several assumptions were made based on historical analytical data regarding the equalization lagoon. Two waste codes, identified by the state, F006 and D007, apply to the hazardous waste discharged to the lagoon. D007, chromium, was detected in several sludge samples above the TCLP limit of 5.0 ppm. Constituents of the listed waste, F006, have also been detected to be present in the equalization lagoon. Two constituents of the F006 listing are cadmium and hexavalent chromium. Cadmium and total chromium were analyzed for in both the groundwater and the sludge. Hexavalent chromium analytical data indicated that it was either non-detect or less than 0.001 ppm. Based on that analytical data, all sludge and subsoil removed from the pond will be considered hazardous waste for the purpose of preparing this closure plan. It is also assumed that the sludge and subsoil will be a candidate for filter press operations and disposal into a RCRA permitted hazardous waste landfill facility.

4.2.1 Sludge and Subsoil Characterization

The first stage of the remediation process will be to more completely characterize the sludge and subsoil following the procedure outlined in section 3.1. For remediation planning, bench scale treatability tests will be required on the sludge to identify the most appropriate technology for dewatering operations (filter press, belt filter, etc.). A two to three gallon homogenized sample of the sludge in the lagoon will be collected for performing bench scale studies for dewatering. The purpose of the study is to obtain information on the filterability of the sludge, filter cake characteristics, selected technology, and full scale cost projections.

4.2.2 Closure Plan Modification

Based upon the analytical results of the lagoon sludge and subsoil characterization performed in Section 3.1, some modifications may be required to this closure plan. Within 30 days after the receipt of the analytical results, a modified plan for clean closure will be submitted to MDEQ for approval in accordance with MHWMR 265.112(c)(2), if such modifications are found necessary. Possible closure plan modifications for clean closure may be required in sections regarding the remediation process, disposal of the sludge and subsoils, and health and safety requirements. Closure activities will begin following MDEQ approval of the modified clean closure plan, or following the conclusion of the preclosure site characterization if no plan modification is needed.

4.2.3 Site Preparation

Closure of any facility is a complex process and requires much preparation to meet regulatory requirements and the field logistical requirements. Therefore a pre-closure site meeting will be held with representatives from the regulatory agency, remediation contractors, Randall Textron and/or its engineer.

The meeting will be for the discussion of the closure plan activities as they pertain to field operations, adequate access to the facility, staging areas for equipment, access to electrical power and other utilities, equipment utilization, personnel requirements, and the various responsibilities of all parties concerned.

4.2.4 Sludge and Subsoil Removal and Dewatering

For the preparation of this closure plan the following assumptions were made regarding the sludge: a volume reduction of 75%, at least a 50% solids content in its present state, and that there is no more than two feet of sludge in the pond. It is also assumed that approximately one foot of subsoil will require removal. Removal of the sludge and subsoil from the lagoon will be accomplished with the combination of a pump, bull dozer, backhoe, and dump trucks. For the dewatering of the sludge from the lagoon it

is currently assumed that a plate and frame filter press mobile unit and the associated headworks will be mobilized to the site by a contractor. The sludge from the lagoon will be pumped to the headworks of the filter press. If the pumpability of the sludge has to be increased, the sludge will be picked up and placed into a hopper using a combination of bulldozer and backhoe. Water from another hopper will then be mixed with the sludge and the slurry will then be pumped to the headworks of the filter press. Under no circumstances will the contractor add water to the lagoon for removal of the sludge.

The sludge may be chemically conditioned if necessary to increase its filterability, as determined by bench scale studies. The conditioned sludge will then be pumped to the filter press for dewatering. The filtrate (effluent from the filter press) may be recycled and used for increasing the pumpability of the sludge as described earlier. Ultimately, all the effluent from sludge dewatering will be sent to the headworks of Randall Textron's current wastewater treatment facility. The effluent will be treated in the wastewater treatment facility and discharged through the NPDES outfall. The contractor will be responsible for providing secondary containment for his operations and adhering to proper health and safety requirements. When sludge dewatering at the site is completed, the contractor shall be responsible for proper equipment decontamination, and disposal of waste generated during decontamination. The contractor will be responsible for leaving the site in a clean condition after demobilization of his equipment.

The dewatered sludge (filter cake) and the excavated subsoil will be transported as a hazardous waste based on the assumptions of this closure plan (section 4.2). It will be transported to an approved RCRA permitted Subtitle C hazardous waste landfill and properly disposed. Three landfill disposal sites have tentatively been identified for the acceptance of the filter cake; these are Carlyss, LA (operated by Chemical Waste Management); Emelle, AL (operated by Chemical Waste Management); and Pinewood, SC (operated by Laidlaw Environmental Services).

Transportation of the filter cake to an approved landfill must be carefully managed due to the potential liability from failure to comply with DOT regulations or spills of waste during transport. Also important will be the accounting for the amount of dewatered

sludge produced, which will be the basis for remediation contractor payment. Therefore, the primary remediation contractor will be responsible for the following items:

- The Contractor shall be responsible for scheduling waste transportation to the disposal facility. The contractor will ensure that the transportation does not interfere with site work schedules.

- The Contractor shall use a licensed hazardous waste transporter for shipment of sludges and subsoils to the disposal facility. He shall transport the dewatered materials to the disposal facility in roll-off boxes, dump trucks, or other MDEQ approved containers. All containers shall be serviceable and shall be marked with the appropriate placard as required by 49 CFR 178 and shall comply with all other DOT and RCRA requirements for the transportation of hazardous waste. Randall Textron reserves the right to inspect and reject any truck or container prior to transporting any waste off site.

- The Contractor shall perform vehicle inspection (e.g. undercarriage, wheels, tarp, tailgate, etc.) for each vehicle before the vehicle leaves the site. Vehicles entering the "Exclusion Zone" or otherwise subject to possible contamination must be decontaminated before entering the Clean Zone and leaving the site. These procedures must be in accordance with Section 8.0.

- Transport trucks or roll-off boxes shall be equipped with plastic liners. The tailgate gasket shall be in like-new condition and the seal shall be checked by the Contractor prior to each use of the box. The containers shall be enclosed with lids and tarps and otherwise sealed to minimize the potential for air emissions or dust.

- The Contractor shall weigh each truck prior to and subsequent to loading with hazardous materials for transportation to the disposal facility. The empty (tare) weights and loaded (gross) weights of all trucks shall be recorded and used to compute the waste quantity to be

entered on the Uniform Hazardous Waste Manifest prior to transportation off site.

- The Contractor shall prepare a Uniform Hazardous Waste Manifest for each load of waste which leaves the Site. The generator's signature block of the manifest will be executed by Randall Textron's designated representative.

- The Contractor shall load trucks in a designated area equipped to contain and collect any spilled material. The decontamination pad may be used for this purpose.

- The Contractor shall dispose of any objects or debris found in the lagoon, disposable protective clothing, and contaminated small tools, together with the sludge and subsoil excavated from the lagoon.

- No waste shall be shipped to any facility which has not been specifically approved by Randall Textron.

4.2.5 Clean Closure Verification

After all of the contaminated sludge and subsoil has been removed and the clean subsoil has been exposed, the same sampling layout used for the sludge and subsoil characterization will be utilized for the clean subsoil verification testing (Figure 3). Each sample will be collected to a depth of six inches bls. The samples will be analyzed for constituents that exceeded clean closure target concentrations during the initial sludge characterization. If a sample of the subsoil contains constituent concentrations above the clean closure standard, then a new sample will be taken 12.5 feet from the contaminated sample in all four magnetic directions. Those four discrete samples will then be analyzed for the constituent that exceeded the clean closure standard. This procedure of stepping out to sample will continue until a clean sample is identified that bounds the area requiring additional removal. The soil within the bounded area will be removed to a depth of six inches. A discrete sample will be collected for laboratory analysis from the bottom of the removal area. If this sample is not contaminated in

excess of the clean closure standard, the removal area will be considered to be clean. If ground water is encountered during the excavation of the subsoil, excavation will be halted.

The contaminated subsoil will be removed with a backhoe and disposed of in the same manner as the filter cake. It will be transported to a landfill in lined and covered trucks by a licensed hazardous waste transporter. All material will be manifested and transported as per MHWMR Part 262 and 263 requirements to a fully permitted landfill for disposal in accordance with the classification of the waste.

4.2.6 Site Closure/Backfill of Equalization Lagoon

The equalization lagoon will be backfilled with native soil, graded and seeded.

4.2.7 Closure Certification

A Professional Engineer registered in the state of Mississippi will be selected by Randall Textron to document and certify closure activities as required by MHWMR 265.115. The engineer will be thoroughly familiar with current waste management practices and with the design, operation, and waste management practices involving closure of equalization lagoons. When the closure has been completed, a certification of this closure plan will be prepared and submitted to the administrative authority within 60 days of completion of the closure per the requirements of MHWMR 265.115.

5.0
SLUDGE AND SUBSOIL SAMPLE CONTROL

5.1 SAMPLE COLLECTION

All samples collected, sludge or subsoil, will be discreet samples from the zones identified in sections 3.1 and 4.2.5. The sludge and subsoil samples will be collected from the locations shown on Figure 3 using a Vibracore Sampler or other equipment as permitted by the sludge and the lagoon conditions. The sampler will be driven to the desired depth in such a manner that the sludge and subsoil are not disturbed prior to the core being taken. The core will be brought to the surface and samples of the sludge and subsoil collected. Samples will then be placed in the appropriate container provided by the analytical laboratory, properly labeled, placed on ice for preservation, and prepared for shipment. Background samples will be obtained by hand augering to the selected depth and collecting a sample by bucket auger.

During verification sampling, the soil samples will be taken from the locations shown on Figure 3 using a stainless steel spoon or trowel immediately following excavation.

Prior to any sampling activity and between sampling events, all sampling equipment will be decontaminated using the following procedures:

- Scrub with potable water to remove mud and residue
- Scrub with an Alconox^{T} detergent solution
- Rinse with clean deionized or distilled water
- Rinse with isopropanol
- Triple rinse with organic-free water or air dried

To minimize the possibility of cross contamination, strict cross contamination control procedures will be followed. These include:

- Sample jars will be kept in a limited access area until used
- Latex gloves will be worn during all sampling activities and changed between sampling events
- Clean plastic sheeting will be placed at the sampling area and all sampling equipment will be placed on it while sampling. The plastic will be discarded in the same manner as the personnel protective equipment.
- All sampling equipment will be wrapped in aluminum foil or plastic sheeting between sampling events after being decontaminated.

For documentation purposes, all information pertaining to field observations and sampling will be recorded in a field log book with consecutively numbered pages. Entries in the logbook will include at least the following:

- Location of the sampling event
- Purpose of the sampling
- Number and approximate volume of the sample
- Description of the sampling point
- Date and time of the sampling event
- Sample identification number
- Method of sample preservation, if required
- Field observations

- Weather conditions
- Collectors name

The documentation in the logbook will be sufficient to reconstruct the sampling event without relying on the sampler's memory.

5.2 SAMPLE CONTROL

All sludge and subsoil samples will be collected, preserved, and shipped according to the analysis being performed. The holding time for hexavalent chromium is 24 hours. If the samples are kept overnight, one person will be responsible for their security. That person will also be responsible for ensuring that those samples are preserved, documented and shipped in a timely manner.

In addition, project identification labels and chain of custody seals will be used by field personnel on all samples collected. These self adhesive tags are placed across the sample container in such a way that the container cannot be opened without breaking that seal. The condition of the seal will be noted on the Sample Master Log to document if any tampering has occurred after the sample was collected.

The chain of custody of a sample will be initiated and maintained as follows:

- A sample will be collected and labeled.
- The sample will be recorded in the field log book, on the request for analysis form, and on the chain of custody form.
- All samples will be accounted for, packed, and shipped to the laboratory in containers that have been sealed with marked custody seals.

Upon receipt at the laboratory, the samples will be logged into the laboratory log book, given a project number, inspected for tampering, and placed into the custody of one person who will be responsible for their analysis. All samples will be inspected for

damage, integrity of the chain of custody, and for leakage. Written records for sample analysis will be maintained.

6.0
ANALYTICAL PROCEDURES

All laboratory analysis for this program will be performed in accordance with approved EPA methods as stated in 40 MHWMR 261 Appendixes II and III. Sampling QA/QC procedures specified in the same referenced document will be used as the guideline for the sampling and analysis of the samples.

7.0
CONTINGENT CLOSURE/POST CLOSURE PLAN

7.1 CONTINGENT CLOSURE OBJECTIVES

Randall Textron's objective for this contingent closure plan is to achieve closure of the equalization lagoon in place in accordance with MHWMR 265.228. Closure of the lagoon in accordance with MHWMR 265.228 includes the following:

- Free liquids shall be eliminated by the removal of liquid wastes or the remaining wastes and waste residues solidified.
- Remaining wastes shall be stabilized to a bearing capacity sufficient to support the final cover.
- A cover shall be placed, designed and constructed to:
  - Minimize the migration of liquids through the closed lagoon on a long-term basis.
  - Require minimum maintenance.
  - Provide drainage and minimize erosion or abrasion of the cover.
  - Maintain the integrity of the cover by accommodating settling and subsidence.
  - Have a permeability less than or equal to the permeability of natural subsoils or any bottom liner system.

Randall Textron intends to implement these activities in the event that clean closure is determined not to be feasible.

The equalization lagoon will then be closed using the following procedures:

- Dewater the lagoon sludge if necessary by draining the lagoon as much as possible.
- Stabilize/solidify the lagoon sludge in place.
- Treat the any liquids generated in the on-site wastewater treatment system.
- Backfill the lagoon with native soil from the area and cap the unit.

7.2 OVERVIEW OF REMEDIATION APPROACH

Randall Textron will close the equalization lagoon by implementing the five major steps listed below:

- Closure plan modification (if required)
- Site preparation
- Sludge stabilization/solidification
- Backfill and cap lagoon
- Closure certification

For the preparation of this contingent closure plan, several assumptions were made based on historical analytical data regarding the equalization lagoon. It is also assumed that the sludge and subsoil will be a candidate for stabilization/solidification in place. The following sections describe the contingent closure approach steps.

7.2.1 Sludge and Subsoil Characterization

The characterization of the sludge and subsoil will have been accomplished as outlined in the procedure in section 3.1. For remediation planning, bench scale treatability tests will be performed for the sludge to identify the most appropriate technology, chemical additives, and mix ratio for solidification/stabilization. The extent and composition of the lagoon bottom liner, if any, will be identified in order to verify cap design.

7.2.2 Contingent Closure Plan Modification

Based upon the analytical results of the lagoon sludge and subsoil characterization performed in Section 3.1, some modifications may be required of this contingent closure plan. Within 30 days after the receipt of the analytical results, a modified plan for contingent closure will be submitted to MDEQ for approval in accordance with MHWMR 265.112(c)(2), if such modifications are found necessary. Possible closure plan modifications for contingent closure may be required in sections regarding the remediation process, stabilization/solidification of the sludge and subsoils, and health and safety requirements. Closure activities will begin following MDEQ approval of the modified contingent closure plan, or following the conclusion of the preclosure site characterization if no plan modification is needed for this contingent closure.

7.2.3 Site Preparation

A pre-closure site meeting will be held with representatives from the regulatory agency, remediation contractors, Randall Textron and/or its engineer. The meeting will be for the discussion of the closure plan activities as they pertain to field operations, adequate access to the facility, staging areas for equipment, access to electrical power and other utilities, equipment utilization, personnel requirements, and the various responsibilities of all parties concerned.

7.2.4 Sludge Stabilization/Solidification

Bench scale studies will be conducted as discussed in Section 7.2.1 to determine the appropriate reagents and optimum mix ratios based on the sludge characteristics and site specific needs. The sludge in the lagoon will be stabilized/solidified in-place. In-place mixing of sludge may be achieved by conventional equipment such as a backhoe or a pull shovel, clamshells and/or draglines. Mixing may also be achieved in-situ by such modern mixing techniques as direct reagent injection and auger mixing to dig into underlying soils which may also be contaminated.

The type of in-place solidification/stabilization technique used to achieve stabilization of the sludge depends on the characteristics of the sludge (chemical characteristics, solids content, viscosity, etc.), the area and volume of the lagoon to be treated and the area available for the operations of the equipment. The type of solidification/stabilization technique will be selected based upon characterization of the sludge as described in Section 3.1, bench scale studies as discussed in Section 7.2.1, and upon simultaneously taking into consideration the site conditions.

The contractor selected for providing the stabilization/solidification services shall be responsible for implementing all relevant, applicable, and appropriate regulatory requirements. In particular the contractor shall meet all worker health and safety requirements and cause no damage to the environment. The contractor shall also adhere to strict equipment decontamination and proper disposal methods.

7.2.5 Site Closure/Capping of Equalization Lagoon

The lagoon shall be backfilled with native soil after stabilizing/solidifying the sludge in the lagoon and covered with a six-inch cover of topsoil and seeded. The fill will be compacted to 90 percent of the maximum dry density. The cover will be installed with at least 3%-5% slope for positive drainage off the top of the cover. The cover will be maintained and inspected annually for vegetative cover and that no water is ponding on the surface of the cover. The proposed components of the protective cover include from top to bottom:

- A vegetative cover
- Six inches of topsoil
- 18 inches of compacted clay
- Compacted backfill

7.2.6 Contingent Closure Certification

A Professional Engineer registered in the state of Mississippi will be selected by Randall Textron to document and certify closure activities as acquired by MHWMR 265.115. The engineer will be thoroughly familiar with current waste management practices and with the design, operation, and waste management practices involving equalization lagoons. When the closure has been completed, a certification of this closure plan will be prepared and submitted to the administrative authority within 60 days of completion of the closure per the requirements of MHWMR 265.115.

7.2.7 Post Closure Notice and Survey Plat

A survey plat of the lagoon indicating the location and dimensions will be prepared and certified by a professional land surveyor as required by MHWMR 265.116. The plat along with other information required by MHWMR 265.119 will be submitted to the local zoning authority, land use agency, and MOPC within 60 days of certification of closure. The plat will contain a notice that states the owner's or operator's obligation to restrict disturbance in accordance with the applicable MHWMR 265 Subpart G regulations.

7.3 POST CLOSURE CARE

The post closure care for the contingent closure will include the following items:

- Care will begin upon completion of the closure and last 30 years unless modified in accordance with MHWMR 265.118.

- The cap will be monitored and maintained.
- The groundwater monitoring system will be maintained and monitored in accordance with MHWMR 265 Subpart F.
- A post-closure plan will be submitted to MDEQ along with the post-closure permit application.

8.0
DECONTAMINATION OF EQUIPMENT

A decontamination pad will be constructed on site to facilitate any decontamination requirements. Water generated from decontamination operations will be treated in Randall Textron's waste water treatment facility and discharged under their NPDES permit.

All pipes leading into and out of the equalization lagoon will be flushed out using water from the Randall Textron facility. After flushing, the pipes will be visually inspected to insure that no sediment remains and then both ends of the pipes will be sealed with a concrete mixture and abandoned in place.

All vehicles that transport the filter cake or soil to the landfill will be washed with a steam cleaner or pressure washer prior to leaving the loading area. As a minimum the sides of the dump bed, wheels, and undercarriage will be thoroughly cleaned prior to leaving the loading area. This will prevent the occurrence of contaminants being taken off-site. At the end of the project, or prior to the removal from the site, all equipment will be steam cleaned or pressure washed. This includes, but is not limited, to trucks, soil excavators, filter press equipment, tools, etc. Any soil that becomes contaminated directly or indirectly from the dewatering of the lagoon sludge and subsoil will be disposed in a manner consistent with the disposal of the filter cake.

All personal health and safety equipment will be either decontaminated or disposed of daily in a manner consistent with the disposal of the filter cake.

9.0
CLOSURE SCHEDULE

It is estimated that closure of the equalization lagoon, described in Section 4.0, can be completed within the required 180 days after approval of the final closure plan. A bar chart is included as Figure 4 and gives a graphical representation of the anticipated closure schedule. This schedule is for planning purposes only and reflects the activities whether clean closure or contingent closure. Actual time may increase due to weather, increased quantities, or other unforeseen circumstances. Several assumptions have been made in the preparation of this closure plan. The schedule included in Figure 4 should be considered a tool to be used for planning and allocating resources and not as an indicator of project deadlines. Randall Textron will request a time extension should that need arise during the closure activities per the requirements of MHWMR 265.113(c)(2).

After completion of the closure, a closure certification report will be prepared and submitted to MDEQ. The report will provide certification by the owner, Randall Textron, and by a registered Professional Engineer that the lagoon has been closed in accordance with the specifications in the approved closure plan. The report will be submitted to MDEQ within 60 days after the completion of closure, in accordance with 40 MHWMR 265.115.

10.0
FINANCIAL ASSURANCE

A letter of financial assurance dated April 24, 1992 has been submitted to the Mississippi Department of Environmental Quality from the corporate headquarters of Randall Textron. A follow up letter dated May 5, 1992 was also submitted. A copy of those letters is provided for your reference in Appendix C.

11.0
ORGANIZATION AND RESPONSIBILITIES

11.1 REMEDIATION CONTRACTOR

Randall Textron will select a remediation contractor who will be responsible for successful completion of the project. The contractor will furnish all technical supervision for labor activities, labor, materials, and equipment necessary to execute this work plan except as noted below. The contractor will be responsible for the supervision, overall coordination, and scheduling of the work of possible subcontractors to include:

- Transportation subcontractor
- Disposal facility

The contractor will also be responsible for construction quality control and health and safety of his site personnel during all phases of the contracted work.

The contractor will provide an overall project management team to include a site manager and administrative personnel capable of providing management for the project, including construction supervision, expediting, labor relations and staffing, manifest preparation, and record keeping.

11.2 LABORATORY ANALYTICAL SERVICES

The laboratory selected will be required to demonstrate acceptable QA/QC procedures for the required analysis. The selected laboratory must also possess the resources to satisfy the rapid turn around analytical needs of this project. The laboratory personnel must be willing to work with Randall Textron's chosen representatives to ensure 100% compliance with all analytical requirements as specified in this document.

11.3 REMEDIATION OVERSIGHT

Randall Textron will retain an independent engineering firm to provide project oversight. The oversight personnel will:

- Ensure that the remediation work is completed in accordance with this closure plan.
- Sample the sludge and subsoil as the work progresses to verify that the desired clean up criteria are met.
- Monitor contractor compliance with the terms and conditions of their contract with Randall Textron and verify quantities for payment purposes.
- Track project progress and scheduling and inform Randall Textron of any potential problem areas. Provide informal progress reports to Randall Textron periodically during the project.
- Provide documentation and certification that the project is completed in accordance with the work plan. Such documentation will consist of a written report at the end of the project to certify closure per the requirements of this closure plan.

12.0
HEALTH AND SAFETY

12.1 TRAINING

All contractor and oversight personnel will have received the initial 40 hour training with annual eight hour updates and respirator fit tests as required in 29 CFR 1910.120. The contractor will provide by certification that workers meet these requirements to Randall Textron prior to beginning work.

The contractor will develop and implement a site specific Health and Safety Plan which meets the requirements of 29 CFR 1910.120. This plan will identify the level of protection for each job task and will include a contingency plan to protect Randall Textron employees from contaminants. It will provide guidelines for upgrading or downgrading the level of personal protective equipment required in response to changing job conditions.

12.2 MEDICAL SURVEILLANCE

All contractor and oversight personnel will have received the initial and annual medical examinations as required in 29 CFR 1910.120. Certification will be provided to Randall Textron prior to beginning work.

12.3 PERSONNEL PROTECTIVE EQUIPMENT

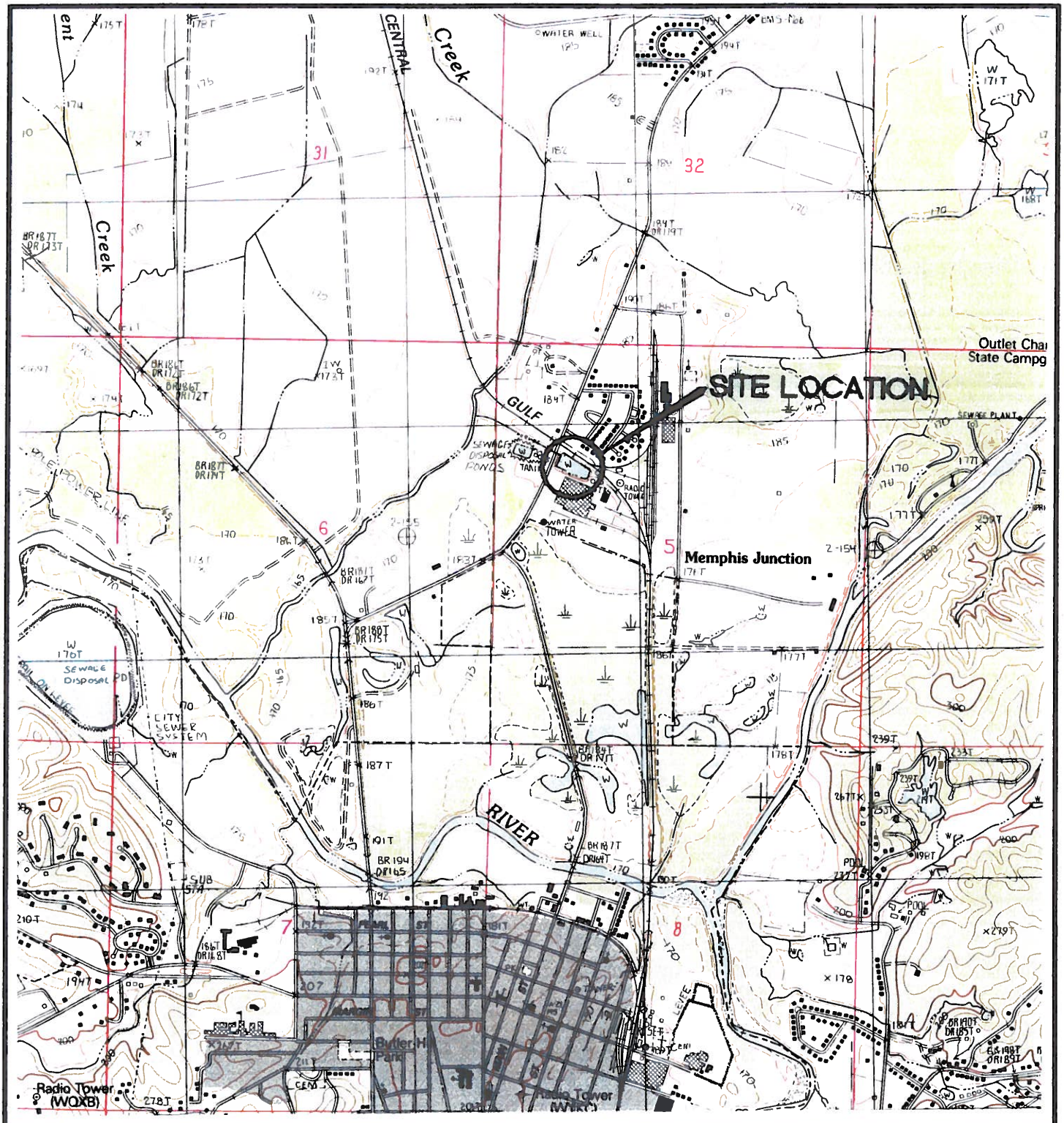
The remediation contractor will provide details of the personnel protective equipment (PPE) and the appropriate procedures for the safe handling of materials removed from the lagoon. All personnel working directly with sludge dewatering process will be in modified USEPA Level D protection which provides dermal protection but no respiratory protection. As a minimum, this consists of:

- Clothing, chemical resistant: paper Tyvek with tight fitting sleeves and pant cuffs.

- Gloves, Chemical resistant: neoprene.
- Boots, chemical resistant with steel toes.

All other activities at the Randall Textron facility require a minimum of hard hats, safety glasses with side shields, and steel-toed boots.

FIGURES



MISS.

QUADRANGLE LOCATION

SOURCE:
U.S.G.S. 7.5 MINUTE QUADRANGLE MAP
GRENADA, MISSISSIPPI, 1983

N

RANDALL TEXTRON
GRENADA, MISSISSIPI

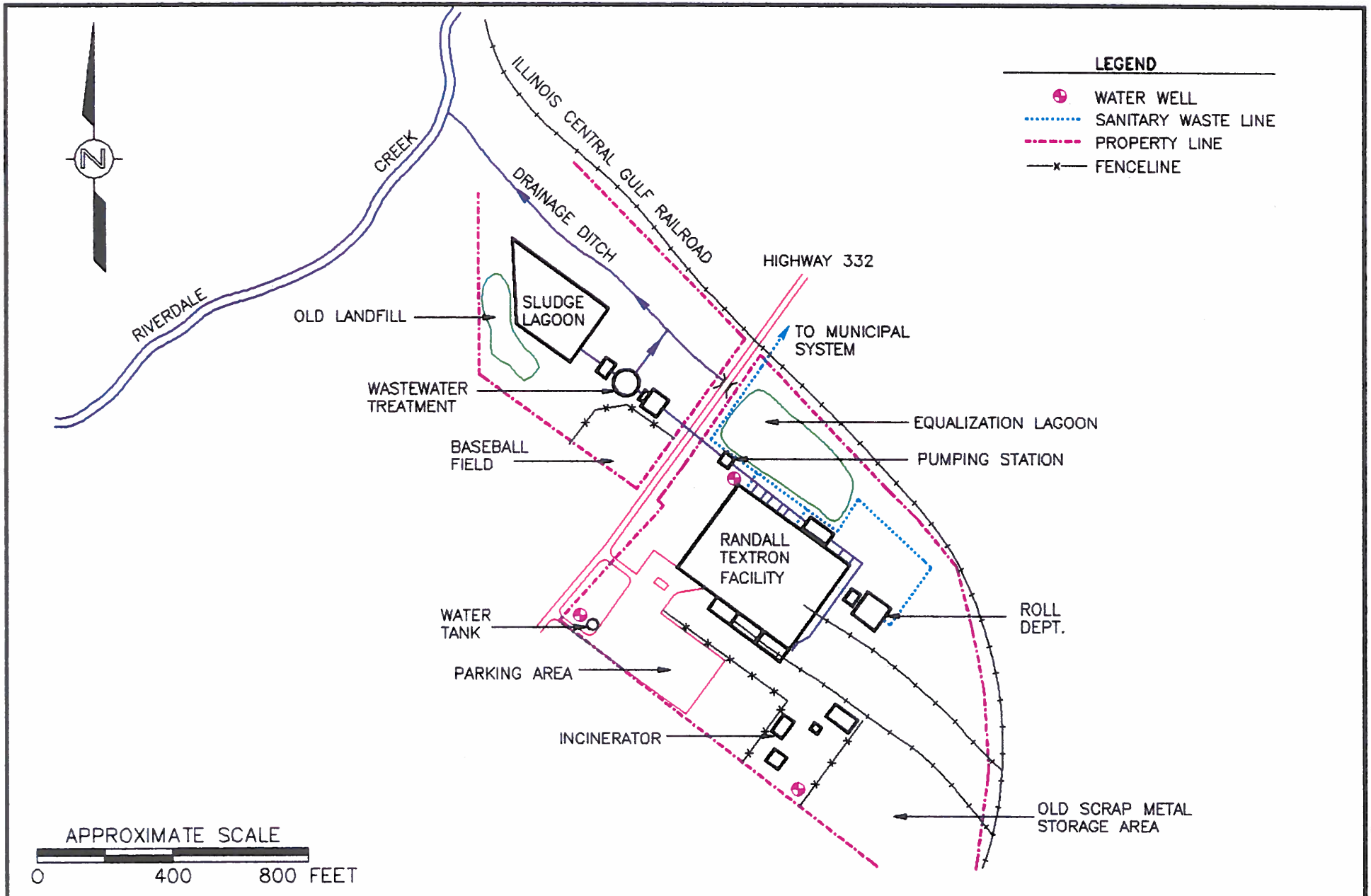
Woodward-Clyde Consultants
Engineering and sciences applied to the Earth and its environment.
Jackson, Mississippi

SCALE:	DRAWN BY: KCS	DATE: 8-24-92
1"=2000'	CHKD. BY: CHD	DATE: 9-2-92

SITE LOCATION

FILE NO. 92J342C

FIG. NO. 1



RANDALL TEXTRON FACILITY
GRENADA, MISSISSIPPI

Woodward-Clyde Consultants
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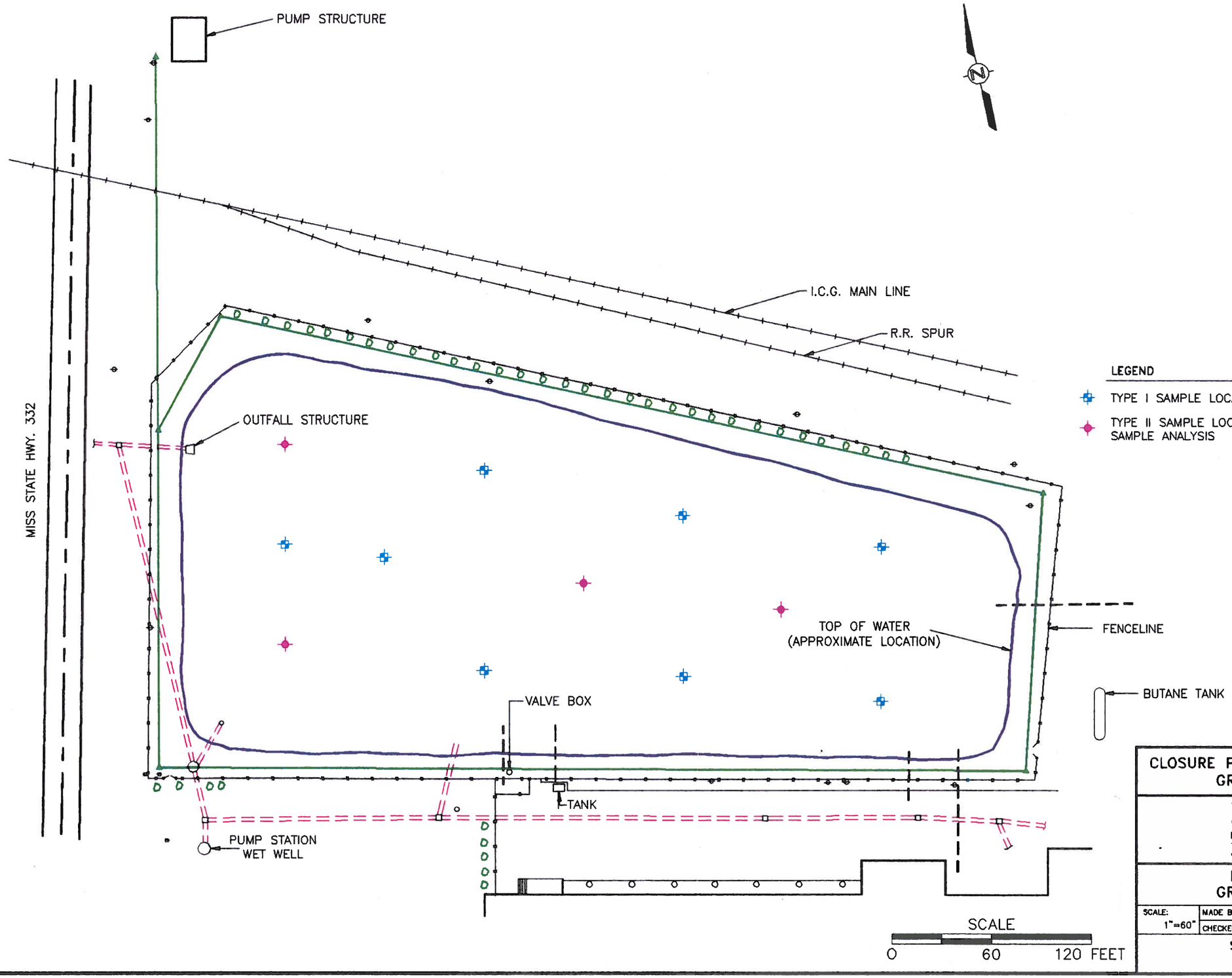
Jackson, Mississippi

SCALE: AS SHOWN	DRAWN BY: KCS	DATE: 8-27-92
	CHKD. BY: CHD	DATE: 9-2-92

SITE MAP

FILE NO. 92J342C
FIG. NO. 2



LEGEND

- TYPE I SAMPLE LOCATION FOR TCLP SAMPLE ANALYSIS
- TYPE II SAMPLE LOCATION FOR TCLP AND APPENDIX VIII SAMPLE ANALYSIS

CLOSURE PLAN FOR RANDALL TEXTRON GRENADA, MISSISSIPPI

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Jackson, Mississippi

RANDALL TEXTRON GRENADA, MISSISSIPPI

SCALE:	MADE BY: KCS	DATE: 11-20-92	FILE NO.
1"=60"	CHECKED BY: CHD	DATE: 11-20-92	92J342C

SLUDGE AND SUBSOIL SAMPLING LOCATIONS

DRAWING 3

RANDALL TEXTRON
CLOSURE SCHEDULE

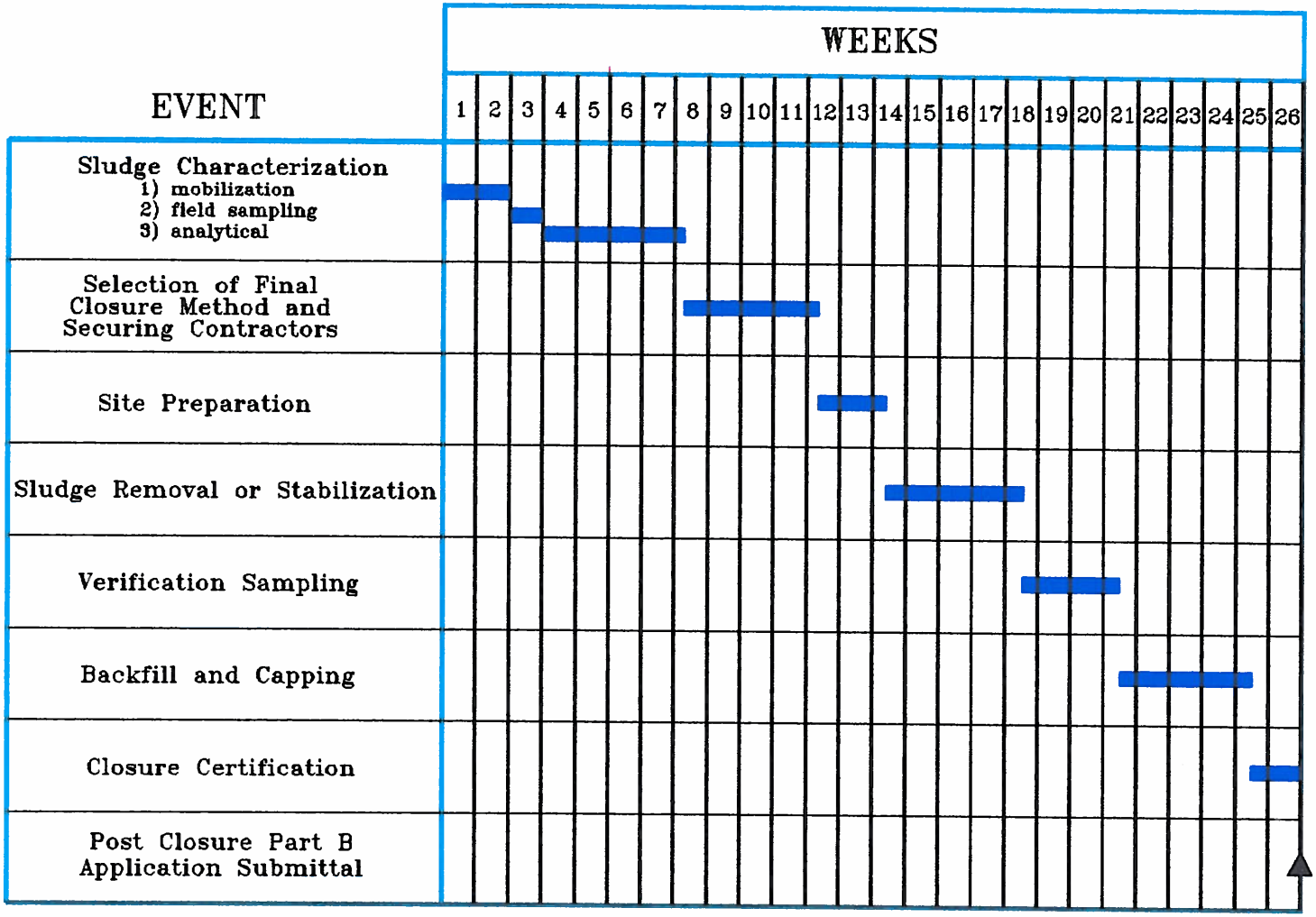

FIGURE 4

Woodward-Clyde Consultants

Engineering & sciences applied to the Earth and its environment
Jackson, Mississippi

APPENDIX A

CLOSURE PLAN CHECKLIST

Facility Name RANDALL TEXTRON
ID No. 007037278

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
I.	**GENERAL CLOSURE REQUIREMENTS**			
+A.	Partial and/or Final Closure			
A-1.	Closure performance standards [§265.111]	Y	1.0	
A-2.	Contents of plan [§265.112(b)]	Y	plan	
+A-2a.	Maximum inventory of wastes [§265.112(b)(3)]	Y	2.3	
A-2b.	Removal/decontamination procedures [§265.112(b)(4)]	Y	4.2.4/8.0	
			7.2.4	
A-2c.	Other activities during closure period [§265.112(b)(5)]	NA	NA	
+A-2d.	Closure schedule for each unit/final closure [§265.112(b)(6) and (7)]	Y	9.0	
+A-3.	Amendment of closure plan [§265.112(c)]	Y	4.2.2/7.2.2	
A-4.	Notification of partial and final closure [§265.112(d)]	NA	NA	
A-5.	Closure activities performed prior to closure plan approval [§265.112(e)]	Y	8.0	
+B.	Time Allowed for Closure [§265.113]	Y	9.0	
B-1.	Extension of closure timeframes [§265.113(a) and (b)]	Y	9.0	
B-2.	Timeframes for demonstrations for extensions [§275.113(c)]	Y	9.0	
C.	Disposal or Decontamination of Equipment, Structures and Soils [§265.114]	Y	8.0/4.2.4/7.2.4	
+D.	Certification of Closure	Y	3.4./4.2.7/7.2.6	
+E.	Survey Plat and Certification by Professional Land Surveyor [§265.116]	Y	7.2.7	
F.	Notices [§265.119]			
F-1.	Record of wastes [§265.119(a)]	NA	NA	
F-2.	Notice in deed [§265.119(b)]	NA	NA	

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
F-3.	Certification of notice [§265.119(b)(2)]	Y	4.2.7/7.2.6	
+G.	Closure Cost Estimate [§265.142]	Y	App C	
G-1.	Adjustments to closure cost estimates [§265.142(b)]	NA	NA	
G-2.	Revisions to closure cost estimates [§265.142(c)]	NA	NA	
H.	Financial Assurance for Closure [§265.143]	Y	App C	
I.	Liability Coverage [§265.147]	Y	App C	

Facility Name RANDALL TEXTRON
ID No. 007037278

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
V.	**CLOSURE OF SURFACE IMPOUNDMENTS**			
A.	Closure by Waste Removal [§265.228]	Y	4.1	
A-1.	Contents of closure plan [§264.112(b)]	Y	Plan	
A-1a.	Description of how each unit will be closed [§265.112(b)(1)]	Y	4.2	
A-1b.	Description of how final closure will be conducted [§265.112(b)(2)]	Y	4.0	
A-1c.	Identification of the maximum extent of operation [§265.112(b)(2)]	NA	NA	
A-1d.	Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	Y	2.3	
+A-1e.	Detailed description of removal of waste inventory [§§265.112(b)(3), 265.228(a)]	Y	4.0	
+A-1f.	Detailed description of removal of waste residues [§§265.112(b)(4), 265.228(a)]	Y	4.0/8.0	
A-1g.	Detailed description of other necessary activities [§265.112(b)(5)]	NA	NA	
A-1h.	Schedule for closure of each unit [§265.112(b)(6)]	Y	9.0	
A-1i	Estimate of expected year of final closure [§265.112(b)(7)]	NA	NA	
A-2.	Decontamination procedures [§§265.112(b)(4), 265.228]			
A-2a.	Procedures for cleaning equipment and removing contaminated soils [§§265.112(b)(4), 265.228(a)]	Y	5.1/4.2.4/8.0	
A-2b.	Management of generated wastes [§§265.114, 265.228(b)]	Y	4.2.4	
+A-2c.	Methods for sampling and testing to demonstrate success of decontamination [§§265.112(b)(4), 265.228(b)]	Y	4.2.7	

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
A-2d.	Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	Y	3.3	
+B.	Closure as a Landfill* [§§265.228(c), 265.310]	Y	7.0	
C.	Post-closure Care* [§§265.118(a), 265.310]	Y	7.3	

*Note: See Section VIII (Closure of Landfills) for the facilities that must meet the requirements of Items B and C.

APPENDIX B

GROUNDWATER REPORT

FILE
92J342C

RCRA DETECTION MONITORING RESULTS FOR THE EQUALIZAITON BASIN RANDALL TEXTRON PLANT GRENADA, MISSISSIPPI

September 1992

Prepared for

Randall Textron Plant
Grenada, Mississippi

Prepared by

Geraghty & Miller, Inc.
Environmental Services
97 Midway Lane
Oak Ridge, Tennessee 37830
(615) 481-3000

GERAGHTY & MILLER, INC.
Environmental Services

Ground Water Engineering Hydrocarbon Remediation Education

September 11, 1992

Mr. Mark Williams
Randall Textron
10179 Commerce Park Drive
Cincinnati, Ohio 45246

Re: Transmittal of RCRA Detection Monitoring Report for the Equalization Basin.

Dear Mark:

Geraghty & Miller, Inc. (Geraghty & Miller) is pleased to submit one copy of the above referenced report. This report was prepared to meet the requirements of the Administrative Order issued March 1991 by the Mississippi Commission on Environmental Quality. The report includes a description of the field activities conducted at the Equalization Basin, the analytical results for ground-water samples, the results of statistical analysis of the data, and conclusions and recommendations.

The investigation confirmed the presence of elevated concentrations of trichloroethene (TCE) and chromium in ground water at the basin. However, based on the data collected, it does not appear that the basin is the source of these contaminants. The direction of ground-water flow and water quality data indicate the source of the TCE and chromium is located somewhere south of the basin; however, the presence of TCE in RT-1 located east of the basin suggests the potential for multiple sources within the plant area. Analysis of samples collected from the basin sediment will be necessary to verify or refute the findings of the ground-water investigation.

Geraghty & Miller appreciates the opportunity to support your RCRA compliance efforts and look forward to being of service to Randall Textron in the future.

Sincerely,
GERAGHTY & MILLER, INC.

C. Allen Motley
Senior Scientist

Jerry A. Archer
Principal Scientist

CAM/bf
OR-92-1139

cc: Jack Schiavone, Textron, Inc.
Caleb Dana, Woodward-Clyde

97 Midway Lane • Oak Ridge, Tennessee 37830 • (615) 481-3000 • FAX (615) 482-5075

RCRA DETECTION MONITORING RESULTS
FOR THE EQUALIZATION BASIN
RANDALL TEXTRON PLANT
GRENADA, MISSISSIPPI

September 11, 1992

Geraghty & Miller, Inc. is pleased to submit this report to Randall Textron for work performed in conjunction with the Randall Textron facility in Grenada, Mississippi. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures to ensure that the report meets the highest standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact the individual listed below.

Respectfully submitted,
GERAGHTY & MILLER, INC.

C. Allen Motley
Senior Scientist

Jerry A. Archer
Associate

CONTENTS

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

The Randall Textron Plant in Grenada, Mississippi is located on State Route 332 north of the Grenada city limits. The plant was built by Lyon, Inc., who opened and operated it from 1961 to about 1966, when it was sold to Rockwell International. Rockwell International operated the plant until it was purchased by Randall Textron in 1985.

In March of 1991, Randall Textron received an Administrative Order from the State of Mississippi requiring the firm to prepare and implement a ground-water monitoring plan at the Equalization Basin in compliance with Resource Conservation and Recovery Act (RCRA) regulations as cited in Mississippi Hazardous Waste Management Regulations (MHWMR) Parts 264 and 265, Subpart F and the guidelines presented in the RCRA Ground-Water Monitoring Technical Enforcement Guidance Document. At the request of Randall Textron, Geraghty & Miller, Inc. (Geraghty & Miller) prepared a RCRA Ground-Water Monitoring Plan (GWMP) for the Equalization Basin. The GWMP was subsequently approved by the State of Mississippi and implementation of the plan was conducted from December 1991 through June 1992.

This report presents the results of the ground-water monitoring conducted in accordance with the GWMP at the Equalization Basin. Included herein is a description of the site hydrogeology, the drilling and well construction procedures, the ground-water sampling procedures, the ground-water analytical results, and the results of the statistical analysis of the ground-water data.

2.0 BACKGROUND

Grenada, Mississippi is located in the north central portion of the state in Grenada County. The Randall Textron Plant is located approximately 3/4 mile north of the urban area of Grenada, and is separated from the town by the Yalobusha River and some fairly extensive wetlands (Figure 2-1). Grenada Lake, an impoundment of the Yalobusha River is approximately 1.5 miles east of the plant at the nearest point. The Yalobusha River passes within 1/2 mile of the plant to the east, flowing in a southwesterly direction until its confluence with Batupan Bogue. From there it flows in a general west-northwest direction and passes within a mile of the plant property to the southwest.

The plant property is bounded by the Illinois Central Gulf Railroad to the north and east, by wetlands to the south, and by Riverdale Creek to the west (Figure 2-1). The site is nearly flat lying at an elevation of approximately 180 ft above mean sea level (msl) and is reportedly a filled wetland (Mark Williams, pers. comm.).

The climate of Grenada County, including the Randall Textron Plant, is moist and subtropical. Winter and spring are the wettest seasons, and the mean annual rainfall is 52 inches (Soil Conservation Service 1967). Average runoff ranges from 16 to 20 inches (Newcome and Bettandorff 1973).

Land use within a one-mile radius of the plant includes industrial, agricultural, recreational, and residential. A wood products processing plant is located along the railroad spur east of the plant. The Grenada Air Industrial Park and Airport are located just over one mile north of the plant. A small residential community is located just north of the Illinois Central Gulf Railroad from the main plant area. Other residences are situated within one mile of the plant along Route 332, within the city limits of Grenada, and along one small road southeast of the plant. The remaining area within a one-mile radius is either wetlands, used for agricultural purposes, or is part of the Grenada Lake Reservation.

The main plant area, located southeast of Highway 332, consists of the manufacturing facility, various storage buildings, an incinerator, a process-water holding pond, parking lots, and a large field previously used for scrap metal storage. The water-treatment plant, a baseball field, and the old landfill are located northwest of Highway 332. The three wells producing ground water for facility use are located on the east side of Highway 332.

The Equalization Basin was excavated in 1961 to receive process wastewater containing metal buffing compound residue and surface-water runoff from the plant. Water from the Equalization Basin was pumped to the water-treatment plant directly across Highway 332. The discharge of chromium-containing wastewater to the basin was discontinued in July 1990. The Equalization Basin is approximately 475 ft long and 225 ft wide at its widest point. The exact depth of the basin is not known but is suspected of being less than 10 ft deep.

In the past, water was pumped from the Equalization Basin to a flocculator and clarifier, then to the sludge lagoon. Supernatant from the sludge lagoon was sent back through the system for additional treatment. Treated water is discharged through a National Pollutant Discharge Elimination System (NPDES) station to Riverdale Creek (Figure 2-2). Sanitary wastes are discharged to the Grenada municipal sewer-system (Mark Williams, per. comm.).

3.0 HYDROGEOLOGY

3.1 GEOLOGY

The Randall Textron Plant is located in the North-Central Hills of Mississippi, a part of the Mississippi Embayment Physiographic Province. Geologically, the Mississippi Embayment is a southward plunging syncline with the axis generally paralleling the Mississippi River (Cushing, et al. 1964). Geologic units dip regionally to the west towards the axis of the Mississippi Embayment, with progressively older units being exposed as one moves from the axis toward the east. A generalized geologic cross section of the plant area is presented in Figure 3-1.

As much as 16 ft of clay and silt fill may directly underlie the plant property. The thickness of this material encountered in boreholes at the basin (Figure 3-2) ranged from 5.0 to 16.0 ft. Underlying the fill is the upper sand aquifer unit, composed mostly of fine- to medium-grained quartz sand with some interspersed clay layers (Figure 3-3). This may be the Winona Sand Formation of the Claiborne Group, which is identified by Wasson (1986) as the uppermost unit in the area. Drilling conducted by Eckenfelder, Inc. elsewhere in the plant area (Figure 2-2) has identified an extensive clay unit at depths of 50 to 60 ft below land surface.

Regional surface-water flow is dominated by the presence of Grenada Lake, an impounded reach of the Yalobusha River, and by the Yalobusha River and extensive associated wetlands. In the immediate vicinity of the plant, surface-water flow is dominated by Riverdale Creek to the west, the discharge ditch from the water-treatment plant to the north, and a system of drainage ditches around the plant property which discharge to wetlands south of the plant. Water in the wetlands which is not lost to evapotranspiration eventually discharges to the Yalobusha River.

Ground water for domestic use in rural areas is obtained from springs and shallow wells. Residences within a mile of the Randall Textron plant receive city water. The City of Grenada well field is located south of the city (Grenada Water Dept., pers. comm.) and probably produces from sands in the Claiborne or Wilcox Groups. Water used at the plant is produced from three wells which are probably screened in sands of the Claiborne Group at depths of approximately 250 ft.

3.2 GROUND-WATER MOVEMENT

Prior to installation of the monitor-well network at the Equalization Basin, the inferred direction of ground-water flow was to the west. Water-level data collected from the five wells installed at the basin indicate ground-water flow is actually slightly northwest. During operation, the basin likely produced a mound in the water table; however, since the basin has been drained, this effect no longer occurs and water levels represent static conditions within the shallow ground-water system.

The elevation of a measuring point on each monitor well installed at the Equalization Basin, referenced to msl at the site, was determined by a licensed surveyor from Joe Sutherland Surveyors in Grenada, Mississippi. Depth to ground-water measurements were referenced relative to msl to determine the precise elevation of the potentiometric surface in each monitor well (Table 3-1). These data were used to generate water-table contour maps of the site which indicate ground-water movement toward the northwest (Figures 3-4 and 3-5) under a very weak gradient.

3.3 HYDRAULIC PROPERTIES

In March 1992, slug tests were conducted on two wells at the basin, RT-1 and RT-2. Using equations based upon Bouwer and Rice (1976), an average conductivity of 8.4×10^{-3} was calculated for the upper water-bearing zone.

Horizontal ground-water flow at the site is toward the northwest at an average gradient of 0.002 (Figures 3-4 and 3-5). Using this average gradient, the calculated hydraulic conductivity, and an assumed effective porosity, the average ground-water flow velocity can be determined as follows:

equation: $$V = \frac{K}{n_e} \times \frac{dh}{dl}$$

where: $\frac{dh}{dl}$ = ground-water gradient calculated from site water-table map

K = hydraulic conductivity derived from slug tests

V = horizontal ground-water flow velocity

n_e = effective porosity

given: $K = 8.4 \times 10^{-3}$ cm/sec

$\frac{dh}{dl} = 0.002$

$n_e = 20\%$ (estimated)

then: $V = \frac{(8.4 \times 10^{-3} \text{ cm/sec}) \quad (0.002)}{0.20}$

$V = 8.4 \times 10^{-5}$ cm/sec

Therefore, the calculated ground-water velocity is 8.4×10^{-5} cm/sec or 0.24 ft/day.

4.0 METHODOLOGY

Drilling activities were conducted in two phases due to drill rig accessibility problems encountered on the west end of the basin. The first phase was conducted from December 16 to 20, 1991, and the second phase was conducted from March 17 to 20, 1992. Soil and ground-water samples were collected to evaluate the potential release of contaminants from the Equalization Basin. Sampling, decontamination, shipping, and analytical procedures were followed as outlined in the site monitoring plan (Geraghty & Miller, Inc. 1991).

The first phase of drilling was conducted utilizing a truck-mounted CME 75 hollow-stem auger rig owned and operated by ENVIROTECH Drilling Company and was used for three of the borings (RT-1 through RT-3). Monitor well RT-2 was placed approximately 50 ft east of the proposed location due to drill rig accessibility problems in the vicinity of the raw waste pump station. Monitor well RT-3 was placed approximately 100 ft west of the proposed location due to utility hazards and concern that the proposed well location would hamper vehicular traffic in the area and the probability that the well would be damaged from vehicles moving through the area. Soil samples were collected continuously to 20 ft from all three borings by utilizing a 2-ft long x 2-in diameter split-spoon sampler. Lithologic descriptions of the material encountered in each boring are presented in Appendix A.

Soils were removed from the split-spoon sampler, described, then placed in pint glass jars, sealed with aluminum foil, and allowed to incubate for at least 30 minutes. Headspace readings were then taken using a photoionization detector (TIP® meter) to evaluate the potential presence of volatile organic constituents. A total of ten headspace readings were collected from each boring.

The second phase of drilling was conducted utilizing a CME 550 hollow-stem auger rig mounted on an all terrain vehicle owned and operated by TTL Drilling Company. Two borings (RT-4 and RT-5) were drilled and soil samples were collected continuously to 20 ft utilizing a 5-ft long x 4-in diameter continuous sampling tool. The proposed monitor well location on the north side of the basin was deleted with the approval of the Mississippi Department of Environmental Quality (MDEQ). Soils collected during this phase of work were processed as mentioned in the previous paragraph.

Headspace analyses for all five borings drilled were nominal except in RT-2 which exhibited moderate headspace values as high as 693 PID units at approximately 16 ft below land surface (Appendix A). No soil samples were sent to the analytical laboratory for analysis.

4.1 MONITOR-WELL CONSTRUCTION

All five borings at the Equalization Basin were completed as monitor wells to a depth of approximately 20 ft. Monitor wells were constructed of 2-in diameter schedule 40 PVC riser and .01-in slot PVC screen. Screened sections were 5 ft in length and were set from approximately 15 ft to 20 ft below ground surface. Monitor wells RT-1 and RT-3 had a filter pack constructed around the screen consisting of a combination of natural formation collapse and 20/40 grade silica sand. Since formation materials at screened depths consisted of a medium to coarse grained sand, monitor wells RT-2, RT-4, and RT-5 were constructed with natural formation collapse around the screened interval. A seal of bentonite pellets was placed on top of the filter pack to a thickness of approximately 2 ft, hydrated with water, and allowed to set for a period of time sufficient to allow hydration. The remaining annulus was filled with a bentonite cement grout mixture. Wells were completed with a 2-ft x 2-ft x 6-in concrete pad and a protective steel casing. Steel protective posts were also placed around the well and filled with concrete to add additional protection from vehicular traffic. Well construction diagrams are presented in Appendix B. Monitor wells were developed using a combination of centrifugal or pneumatic pumps and/or hand bailing. The wells were developed until the water was clear and sediment free or until the parameters of specific conductance and temperature had stabilized. Additional development was conducted to ensure the removal of any water that was added to the well during well installation. Development of RT-4 was supplemented with a surge block during the second round of sampling to increase well yield.

4.2 GROUND-WATER SAMPLING

Dedicated Teflon® bailers were placed in each monitor well at the basin. Water samples were collected monthly for 4 months using the dedicated bailers. Wells were purged of a minimum of three well volumes and the parameters of specific conductance and temperature were measured to ensure fresh formation water was collected during sampling. All five wells were sampled for parameters characterizing the suitability of the ground water as a drinking-water source, parameters to establish ground-water quality, contamination

indicator parameters, and volatile organic compounds. Table 4-1 lists the parameters analyzed, the analytical method, and the applicable detection limit for the ground-water samples collected at the Equalization Basin. All of the samples were submitted to Savannah Laboratories & Environmental Services, Inc. in Savannah, Georgia for analysis.

4.3 QUALITY ASSURANCE/QUALITY CONTROL

4.3.1 Decontamination

All augers, split spoons, and continuous sampling equipment were thoroughly decontaminated prior to commencing work and between each borehole and sampling events. Soil sampling equipment was likewise decontaminated between each sampling event. All of the Teflon® bailers used for ground-water sampling were also decontaminated prior to initial placement into the wells. The decontamination procedure consisted of steam cleaning, wash with laboratory grade detergent (MICRO®), rinse with organic free water, wash with pesticide grade isopropanol and final rinse with organic free water. Other equipment such as pump hoses and pumps were washed with laboratory grade soap and steam cleaned.

4.3.2 Laboratory Analysis

All sampling and analysis was performed in accordance with Geraghty & Miller's Analytical Quality Assurance and Laboratory Contract Program (AQA/LCP). The purpose of the program's procedures is to ensure that the sampling and analysis effort produces defensible data, to verify that data quality objectives have been met and to verify that the laboratory has met performance requirements.

A Laboratory Task Order (LTO) was prepared by Geraghty & Miller and submitted to Savannah Laboratories. Savannah Laboratories is an approved AQA/LCP laboratory and has signed a contract specifying quality control procedures and rates for analytical services. The LTO communicates to the laboratory the matrix type, parameters of interest, methods of analysis, and required detection limits.

During actual sampling, water sampling logs were maintained. Dedicated bailers, suspended in the well casing between uses, were used to collect ground water samples from each well. Quality assurance samples such as field blanks, a rinsate blank from one of the Teflon bailers, trip blanks, and duplicates were collected to verify that any contaminants that

were observed were actually present in the sample and were not the result of the sampling procedure or equipment. Immediately after collection, each sample was packed in ice within clean coolers. Chain-of-custody forms documenting the sample collection date, preservative used, sample container type, and required analytical parameters accompanied the samples from the site to the laboratory.

The data validation process consisted of a thorough review of the field and analytical data packages. A check was made to confirm that all holding times (time between sample collection and analysis) were less than the maximum allowed. Some results for pH and volatiles were qualified as estimated (J) because holding times were exceeded. Reported detection limits and analytical methods were checked against those required in the LTO and the method description. Also, the results of laboratory blanks and other quality control samples such as matrix spikes were evaluated. Some results for selenium, chloride, and mercury were qualified as estimated (J) based on laboratory quality assurance information. Analytes detected in field, trip, or rinsate blanks were noted. Any result which was detected in a sample at a concentration of less than five times the amount detected in an associated blank was qualified as undetected (B). TOC and TOX were detected in rinsate and/or field blanks resulting in a B qualifier being assigned to some TOC and TOX data. The complete data packages, are contained in Appendix C.

5.0 GROUND-WATER QUALITY

Ground-water samples collected from existing wells in the plant area by Eckenfelder, Inc. during 1991 were analyzed for major ions. The major ion data for four representative wells are illustrated on Figure 5-1. The data indicate that shallow ground water (MW-1 and MW-7) and deep ground water (Plant well) are of the sodium-bicarbonate type. The ground water sampled by MW-10, completed at the base of the upper sand unit (Figure 3-1), is of the sodium-chloride type.

Ground-water samples at the Equalization Basin were collected on a monthly basis from all five monitor wells (RT-1 through RT-5) from March through June, 1992. Monitor well RT-1, located on the eastern side of the basin, is located hydraulically upgradient of the basin and provides water-quality data representative of background conditions at the basin. For the purposes of this report, the analytical results have been compared to the U.S. Environmental Protection Agency (EPA) primary maximum contaminant levels (MCL) (MHWMR Part 264.94). Parameters for which no drinking-water standard exists have been compared to background levels. A summary of analytical results is provided in Table 5-1. Complete analytical results can be found in Appendix C.

5.1 METALS

The samples collected for metals analysis were unfiltered; therefore, the results indicate total metals concentrations. Variations in the amount of suspended solids in the samples likely accounts for some of the variability in the analytical results.

Of the metals in ground water exceeding primary or secondary drinking water standards around the basin, chromium exhibited reported concentrations of the most interest (Figure 5-2). Monitor wells RT-2 and RT-3 have the highest reported concentrations of chromium ranging from 41 mg/L to 55 mg/L in RT-2 and 77 mg/L to 85 mg/L in RT-3. The MCL for chromium is 0.1 mg/L. Well RT-4 had a reported chromium concentration exceeding the MCL during one of the four sampling events (0.110 mg/L during second round). Wells RT-1 and RT-5 had reported chromium concentrations below the MCL for all rounds of sampling.

The MCL for lead is 0.05 mg/L. Lead was reported above 0.05 mg/L in wells RT-2 and RT-3 with a concentration of 0.067 mg/L in RT-2 and 0.15 mg/L in RT-3. Both of these

concentrations were reported in the first round results and dropped below 0.05 mg/L in subsequent sampling events. Lead concentrations reported for background well RT-1 ranged from less than 0.005 mg/L to 0.022 mg/L. By comparison, lead concentrations in the downgradient wells RT-4 and RT-5 ranged from 0.0056 mg/L to 0.032 mg/L and from less than 0.005 mg/L to 0.019 mg/L, respectively.

Mercury was reported above the MCL of 0.0002 mg/L in RT-3 at a concentration of 0.0005 mg/L during the first round sampling event. Subsequent sampling of RT-3 has reported results for mercury below the detection limit of 0.0002 mg/L. This is the only reported occurrence above the MCL and the detection limit for mercury in the wells. Mercury was detected in the field blank collected during the last round of sampling at a concentration of 0.00045 mg/L but this detected concentration does not appear to have affected the results for mercury during the fourth round sampling.

Arsenic and barium had reported concentrations above the detection limit of 0.01 mg/L but all concentrations were below the MCLs of 0.05 mg/L and 2.0 mg/L, respectively. None of the wells had concentrations below the detection limits all four sampling rounds.

Selenium and silver were not detected above their respective detection limit in any sampling round in any well.

Iron exceeded the non-enforceable secondary drinking-water standard of 0.3 mg/L in all five monitor wells and during all four rounds of sampling. Iron was also reported above the secondary MCL in sample RT-H (a sample taken from an on-site fire hydrant that was used as a water source for decontamination and well installation purposes). The highest reported concentration of iron was in RT-3 (250 mg/L) during first round sampling; however, concentrations steadily dropped during subsequent sampling events. The lowest reported iron concentration was 1.7 mg/L in RT-2 during the third round sampling event.

Manganese exceeded the secondary drinking-water standard of 0.05 mg/L in all wells and in all four sampling events. The highest concentration of manganese was 7.2 mg/L in well RT-3 during the first round sampling. The lowest reported concentration was 0.38 mg/L in RT-2 during the third round sampling. Manganese was also reported in sample RT-H at a concentration of 0.15 mg/L.

Sodium concentrations ranged from 67 mg/L in first round results for RT-2 to 130 mg/L also in first round results for RT-3. There is no MCL for sodium; however, sodium concentrations in background well RT-1, ranging from 87 mg/L to 100 mg/L, were similar to concentrations reported in the other wells.

5.2 VOLATILE ORGANIC COMPOUNDS

Trichloroethene (TCE) is the primary volatile organic compound detected in the vicinity of the basin. The MCL of 5.0 µg/L for TCE was exceeded in all five monitor wells and in all four sampling rounds. The lowest reported concentrations of TCE were detected in the background well RT-1 with concentrations ranging from 87 µg/L to 130 µg/L. The highest TCE concentrations were detected in RT-2 with concentrations ranging from 53,000 µg/L to 130,000 µg/L. Wells RT-3 and RT-5 also had high concentrations of TCE ranging from 4,900 µg/L to 77,000 µg/L. Well RT-4 exhibited moderate concentrations of TCE ranging from 290 µg/L to 860 µg/L (Figure 5-2). An isopleth map of the mean TCE concentration, based on the four sampling events, illustrates the decreasing TCE concentrations from south to north across the basin (Figure 5-3).

TCE in ground water can be transformed by anaerobic bacteria into daughter products. The biodegradation products of TCE include cis- and trans-1,2-dichloroethene which in turn are transformed into vinyl chloride. Trans-1,2-dichloroethene (trans-1,2-DCE) was not detected at the Equalization Basin; however, cis-1,2-dichloroethene (cis-1,2-DCE) was detected. This is consistent with research findings on TCE degradation that indicates the formation of cis-1,2-DCE is favored over the formation of trans-1,2-DCE by over 25 to 1 (Vogel, Criddle, and McCarty 1987).

Cis-1,2-DCE was detected in all monitor wells. Cis-1,2-DCE has an MCL of 70 µg/L. Only well RT-1 had reported concentrations below the MCL with concentrations ranging from 5.2 to 5.5 µg/L (Figure 5-4). The highest concentrations of cis-1,2-DCE were in wells RT-2 and RT-3 with each having a reported maximum concentration of 5,700 µg/L. Well RT-4 had reported concentrations ranging from below detection limits (<50 µg/L) to 5,200 µg/L. The ratio of the mean concentrations of cis-1,2-DCE to TCE at RT-5 is 0.5 compared to 3.7 at RT-4. This indicates that the TCE has undergone a greater degree of biodegradation at RT-4 than at RT-5.

The end member of the TCE degradation chain is vinyl chloride. Vinyl chloride was quantitatively detected only at RT-4; however, elevated detection limits may have prevented the detection of vinyl chloride at RT-2, RT-3, and RT-5. The concentration of vinyl chloride at RT-4 ranged from less than 100 µg/L to 1,100 µg/L. Although vinyl chloride concentrations at RT-5 did not exceed elevated detection limits, it is significant to note that the 500 µg/L detection limit is substantially less than the concentrations detected in three out of four sampling events at RT-4. The hydraulic gradient and water-quality data suggest the source of the TCE is south of the basin based upon the presence of higher vinyl chloride concentrations and a higher concentration ratio of vinyl chloride to TCE at RT-4 as compared to RT-5. The higher concentration ratio of both vinyl chloride and cis-1,2-DCE to TCE at RT-4 indicates this well is located in an older portion of the plume and thus, is located farther away from the TCE source than well RT-5.

Detection limits were elevated for all rounds of sampling in RT-2, RT-3, RT-4, and RT-5 because samples from these wells had to be diluted to accommodate the TCE and cis-1,2-DCE concentrations. Because of the high detection limits, the presence or absence of concentrations of the other volatile organics listed cannot be ascertained. None of the QA/QC blanks had reported concentrations of volatile organics above detection limits.

5.3 MISCELLANEOUS PARAMETERS

Ground-water samples for pH analysis in the laboratory indicate the ground water in the vicinity of the basin is slightly acidic. The lowest pH value was reported in background well RT-1 (5.7 units) during the third round sampling. The highest pH value reported was in RT-5 during second round sampling with a value of 7.2 units. In all, most pH values were just below the secondary level for pH which is 6.5 to 8.5 units. All five wells had at least one round of sampling where the pH value fell within the 6.5 to 8.5 unit secondary MCL.

Values for specific conductance were generally uniform for all wells at the basin. The highest specific conductance value reported from the laboratory was 840 µmhos/cm in well RT-3 during fourth round sampling, and the lowest value was reported in well RT-4 (460 µmhos/cm) during first round results. All wells exhibited specific conductance values comparable with background well RT-1.

Reported chloride concentrations were above the 1.0 mg/L detection limit for all wells and for all sampling events. None of the wells, however, exceeded the 250 mg/L secondary

MCL for chloride. The highest reported chloride concentration was in background well RT-1 with three rounds of results reporting 150 mg/L chloride. The lowest chloride concentration was reported in well RT-2 during first round sampling with 42 mg/L chloride.

Reported fluoride concentrations were below the secondary MCL of 2.0 mg/L for all wells. Only well RT-3 had detected concentrations of fluoride for all four sampling events with concentrations ranging from 0.38 mg/L to 0.59 mg/L. Wells RT-1 and RT-2 fluoride results were below detection limits for all rounds. Wells RT-4 and RT-5 had one round of results above detection limits with concentrations of 0.23 mg/L and 0.30 mg/L respectively.

Reported concentrations for nitrate were well below the 10 mg/L MCL for nitrate. The highest reported concentration of nitrate was in well RT-1 with a concentration of 0.60 mg/L. Wells RT-2 and RT-3 had reported concentrations below detection limits and wells RT-4 and RT-5 had only nominal concentrations of nitrate (less than 0.05 to 0.57).

Sulfate concentrations were also well below the secondary MCL of 250 mg/L. All wells had reported concentrations of sulfate and the highest reported sulfate concentration was 150 mg/L during third round sampling in well RT-5. The lowest sulfate value was reported in the first round results in RT-4 with a concentration of 65 mg/L.

Total recoverable phenolics (phenolics) was reported below detection limits for all wells except in wells RT-3 and RT-5. Both wells had detected concentrations of phenolics during the first sampling event. RT-3 had the highest concentration of 0.052 mg/L and RT-5 had a detected concentration of 0.018 mg/L.

Values for total organic carbon (TOC) were low in the area of the basin. The background concentration (well RT-1) of TOC ranged from 3.7 to 5.1 mg/L. The other wells had reported concentrations comparable to or slightly higher than RT-1. Well RT-3 had the highest TOC concentration at 24 mg/L during third round sampling, considerably higher than the other three rounds collected from this well.

Total organic halogen (TOX) concentrations were also reported above detection limits in all five wells. The lowest concentrations were in background well RT-1 with concentrations ranging from 0.065 to 0.23 mg/L. The other wells had noticeably higher concentrations of TOX with the highest concentrations in well RT-2 ranging from 49 to 59 mg/L. Well RT-3 also had concentrations of TOX far above background with

concentrations ranging from 31 to 45 mg/L. Wells RT-4 and RT-5 had lower concentrations ranging from 1.1 to 6.5 mg/L.

6.0 STATISTICAL ANALYSIS OF GROUND-WATER MONITORING DATA

6.1 BACKGROUND

Five monitor wells were installed at the Equalization Basin to determine if disposal of hazardous waste has adversely impacted the ground water. Figure 3-2 shows the spatial arrangement of the monitoring wells around the Equalization Basin. Based on hydraulic head data collected from the monitoring wells during four rounds of sampling, the direction of ground-water movement beneath the Equalization Basin was determined to be to the northwest (Figures 3-4 and 3-5). Well RT-1, located east of the basin, is hydraulically upgradient of the basin, and wells RT-4 and RT-5, located west of the basin, are hydraulically downgradient of the basin. Wells RT-2 and RT-3 are located along the southern edge of the basin and are also hydraulically upgradient; however, RT-2 was originally intended to provide additional downgradient monitoring along the western edge of the basin but access restrictions prohibited its installation at the desired location. Statistical comparisons were made using all five wells to determine if concentrations downgradient of the basin are significantly higher than upgradient concentrations.

6.2 METHODOLOGY

The purpose of the statistical analysis was to determine if statistically significant evidence of contamination exists in the ground water downgradient of the Equalization Basin. Generally, a detection monitoring program would establish initial background concentrations of indicator parameters (pH, specific conductance, TOC, and TOX), defined as the average concentration in upgradient wells, during the first year of sampling. Subsequent sampling results obtained after the first year of monitoring would be compared to the initial background values to determine if statistically significant evidence of contamination exists. In this case, however, data is available for only four rounds of monthly sampling. Therefore, the statistical analyses involved comparing mean concentrations, calculated over the four rounds of sampling, in the upgradient well(s) to mean concentrations in individual downgradient wells. Ground-water samples were analyzed for drinking-water parameters (as per MHWMR Appendix III minus pesticides, radiologic parameters, coliform, and turbidity), ground-water quality parameters, contamination indicator parameters, and volatile organic constituents (Table 6-1). Comparisons were performed for each constituent detected in the ground water at the Equalization Basin (Table 6-1).

Statistical comparisons were made using a parametric analysis of variance (ANOVA), which is the EPA's preferred method for comparing compliance to background data (or downgradient to upgradient) (U.S. Environmental Protection Agency 1989). If a release has occurred from the Equalization Basin, it is unlikely to have impacted all the wells equally. Thus, mean concentrations among the wells would be different, and such differences can be detected by ANOVA. One-way parametric ANOVA is used when the primary concern is differences between monitoring wells for a given sampling event. When several sampling periods are used and it is necessary to consider the effects of seasonality, a two-way parametric ANOVA is appropriate. The one-way ANOVA is appropriate in this case because the data were collected in less than one year, therefore, the effects of seasonality cannot be determined. The one-way parametric ANOVA was performed on the natural logarithms of concentration data which followed a lognormal distribution.

In order to apply a parametric ANOVA, a minimum of two wells with at least three observations each is necessary (U.S. Environmental Protection Agency 1989). The total number of observations should be large enough so that the total number of observations minus the number of wells is greater than five. Each ANOVA results in a calculated F statistic which is compared to the tabulated or critical F statistic for the specified alpha level. An alpha of 0.05 (5 percent significance level) was used in all comparisons in this case as recommended in MHWMR 264.97(i)(2). If the calculated F statistic is greater than the tabulated F value, a statistically significant difference exists among well means. If the comparison involves more than two wells, further comparisons are necessary to determine which wells exhibit statistically significant evidence of contamination. For ANOVAs which were significant at the 5 percent level, the Bonferroni multiple comparisons procedure was performed to determine which downgradient wells had a mean concentration that was statistically different from the mean upgradient concentration. In some cases where the calculated F statistic was significant, the Bonferroni test showed that the downgradient wells were not statistically different from the upgradient wells. In these cases, the F statistic was significant due to variation among the upgradient wells.

Analytical results which were reported as less than a detection limit were replaced by a value equal to the detection limit unless the reported detection limit was elevated above the normal detection limit. Elevated detection limits were replaced by a value equal to one-half the elevated detection limit. This convention for handling less than detection limit values is recommended by EPA (1989). Elevated detection limits were reported for vinyl chloride and cis-1,2-DCE in wells containing high levels of TCE, the most abundant organic compound

detected in the ground water at the Equalization Basin. Both vinyl chloride and cis-1,2-DCE are degradation products of TCE; therefore, it is reasonable to expect these compounds to be present in wells containing high levels of TCE. Generally, TCE was the most abundant volatile compound followed by cis-1,2-DCE and vinyl chloride. Wells RT-2 and RT-3 both contained very high levels of TCE, however, vinyl chloride was reported below a detection limit which was elevated due to the presence of TCE. Cis-1,2-DCE was reported below an elevated detection limit on fewer occasions because it was relatively more abundant than vinyl chloride.

6.3 RESULTS

Statistically significant results are summarized on Table 6-2. ANOVA calculations for each comparison are included in Appendix D. A total of 12 ANOVAs produced statistically significant results. Included in these 12 results was one drinking water metal (chromium), five water quality parameters (sodium, chloride, nitrate, and sulfate), three contamination indicator parameters (specific conductance, TOC, and TOX), and three volatile organic compounds (TCE, vinyl chloride, and cis-1,2-DCE). Of these, only chromium and the three organic compounds are considered hazardous constituents.

Several of the ANOVAs were significant because the upgradient concentrations were significantly higher than concentrations in the downgradient wells, indicating that the Equalization Basin is not the source of those constituents in the ground water. Constituents in this category include chromium, specific conductance, chloride, fluoride, TOX, TCE, vinyl chloride, and cis-1,2-DCE.

The Bonferroni multiple comparisons test was performed for all significant ANOVAs. The Bonferroni test showed that, for sodium, nitrate, and TOC, there is not a significant difference between the mean concentration in the upgradient wells and the concentration in the downgradient wells. This indicates that the ANOVA was significant due to the variation among the upgradient wells rather than between upgradient and downgradient wells. Examination of concentrations for these parameters confirms this. Mean sodium concentrations in the three upgradient wells vary from 77.37 to 116.25 mg/L; whereas, mean concentrations in the downgradient wells were 98 and 96.75 mg/L. Thus, the mean upgradient concentration, 95.87 mg/L, was only slightly lower than the downgradient means. Nitrate and TOC followed similar patterns except the mean upgradient TOC concentration was higher than the mean concentration in downgradient wells.

Sulfate is the only parameter that was detected in significantly higher concentrations downgradient of the Equalization Basin compared to concentrations upgradient of the basin. The mean sulfate concentration in RT-5 (127.5 mg/L) is significantly higher than the mean upgradient concentration (97.96 mg/L) but still below secondary drinking-water levels. The mean sulfate concentration in RT-4 (94.25 mg/L) was less than the mean upgradient concentration.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Five monitor wells were installed at the Equalization Basin during December 1991 and March 1992. Although monitor well RT-1 was anticipated to be upgradient of the basin, water-level data collected from all five wells indicate that wells RT-2 and RT-3 are also upgradient and only wells RT-4 and RT-5 are truly downgradient of the basin.

Based upon the analytical results for ground-water samples collected from the monitor wells at the Equalization Basin, ground water in the vicinity of the basin has been impacted by elevated concentrations of several constituents, in particular, chromium and TCE. However, the distribution of these constituents coupled with the hydraulic gradient data indicate the basin is not the source of these ground-water contaminants. Monitor wells RT-2 and RT-3 on the south side and upgradient of the basin contain the highest concentrations of chromium and TCE suggesting the source of these contaminants is located to the south of the basin. Comparison of the ratios of the concentrations of TCE degradation daughter products to TCE concentrations within each well also supports the premise that the source of TCE is located south of the basin. The concentration ratio is highest at RT-4, located immediately downgradient of the basin, indicating the TCE plume has undergone a higher degree of degradation at this well location than at the other well locations. Therefore, RT-4 is located in an older portion of the TCE plume and thus, farther from the source than RT-5, RT-2, and RT-3.

Likewise, chromium concentrations decrease dramatically (up to three orders of magnitude) from RT-2 and RT-3 to RT-4 and RT-5. Again, indicative of the closer proximity of RT-2 and RT-3 to the chromium source than RT-4 and RT-5.

Statistical analysis of the data confirms no significant increases in concentrations of indicator parameters (or pH decreases), in comparisons of downgradient to upgradient wells, have occurred at the Equalization Basin.

Although the ground-water data indicate the presence of a source of chromium and TCE other than the Equalization Basin, a sampling and analysis program conducted on the sludges and subsoils beneath the basin would serve to confirm or refute the findings of the ground-water investigation. Additionally, in order to maintain compliance with MHWMR 265.92, it is recommended that Randall Textron continue to collect ground-water samples in accordance with MHWMR 265.92(d) and (e) until final closure of the basin. These

requirements specify the sampling and analysis for parameters establishing ground-water quality (chloride, iron, manganese, phenols, sodium, and sulfate) annually and parameters used as indicators of ground-water contamination (pH, specific conductance, TOC, and TOX) semi-annually.

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TABLES

Table 3-1. Summary of Water-Level Elevations

Randall Textron Plant Grenada, Mississippi

Well Number	Date Measured	Depth to Water (ft)	Measuring Point Elevation (TOC) (ft, msl)	Water-Level Elevation (ft, msl)
RT-1	3/92	12.02	185.18	173.16
	4/92	12.12		173.06
	5/92	12.46		172.72
	6/92	12.76		172.42
RT-2	3/92	12.00	184.56	172.56
	4/92	12.17		172.39
	5/92	12.46		172.10
	6/92	12.76		171.80
RT-3	3/92	N/A	184.00	—
	4/92	11.36		172.64
	5/92	11.65		172.35
	6/92	11.98		172.02
RT-4	3/92	12.63†	184.33	171.70†
	4/92	12.24		172.09
	5/92	12.52		171.81
	6/92	12.77		171.56
RT-5	3/92	12.07†	184.17	172.10†
	4/92	12.05		172.12
	5/92	12.33		171.84
	6/92	12.58		171.59

21AUG92 Ba

ft - feet
msl - mean sea level
TOC - top of casing
N/A - not available

† Approximate values. Wells had not reached equalibrium at time of measurement.

Table 4-1. Target Compounds, Analytical Methods, and Method Detection Limits

Randall Textron Plant Grenada, Mississippi

Parameter	Analytical Method	MDL (mg/L)
Ground-Water Quality		
Chloride	325.2	1.0
Iron	200.7	0.05
Manganese	200.7	0.01
Sodium	200.7	0.01
Sulfate	375.2	5
Phenolics (Tr)	9065	0.01
Drinking-Water Quality		
Arsenic	206.7	0.01
Barium	200.7	0.01
Cadmium	200.7	0.005
Chromium	200.7	0.010
Fluoride	340.2	0.20
Lead	239.2	0.005
Mercury	245.1	0.0002
Nitrate (as N)	353.2	0.05
Selenium	270.2	0.010
Silver	200.7	0.010
Volatile Organic Compounds	624	0.005 - 0.010
Contamination Indicators		
Total Organic Carbon (TOC)	9060	1.0
Total Organic Halogen (TOX)	9020	0.005
Specific Conductance	9050	1.0 µmhos/cm
pH	9040	0.1 pH unit

3SEP92 Ba

Table 5-1. Summary of Analytical Results

Randall Textron Plant Grenada, Mississippi

Parameter	RT-1				RT-2				RT-002^
Date Sampled:	3/92	4/92	5/92	6/92	3/92	4/92	5/92	6/92	6/92
Metals (mg/L)									
Arsenic	0.012	<0.010	<0.010	<0.010	0.044	<0.010	<0.010	<0.010	<0.010
Barium	0.23	0.17	0.062	0.067	0.28	0.062	0.07	0.086	0.11
Cadmium	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium	0.098	0.069	0.013	0.014	41	47	51	55	52
Iron	34	24	4	5.1	69	1.9	1.7	4.3	9.9
Lead	0.022	0.0069	0.0037	<0.0050	0.067	<0.0050	<0.0050	<0.0050	0.0086
Manganese	2.0	1.4	0.62	0.71	3.2	0.44	0.38	0.53	0.78
Mercury	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Selenium	<0.010	<0.050 J	<0.020	<0.010 J	<0.010	<0.010 J	<0.020	<0.010 J	<0.010
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sodium	98	91	87	100	67	76	83	85	82
Miscellaneous Parameters									
pH (units)	6.0 J	6.6 J	5.7 J	5.9 J	6.1 J	6.6 J	6.0 J	6.2 J	6.4 J
Specific Conductance (µmhos/cm)	590	560	570	680	510	550	650	700	700
Chloride (mg/L)	110 J	110	90	110	42 J	51	59	63	64
Fluoride (mg/L)	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrate (mg/L)	0.60	0.34	0.37	0.19	<0.50	<0.50	<0.50	<0.050	<0.050
Sulfate (mg/L)	88	98	110	96	83	94	97	90	85
Phenolics* (mg/L)	<0.010	<0.020	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010
TOC (mg/L)	5.0 B	3.7 B	4.7 B	5.1 B	4.6 B	6.5 B	14	8.1 B	8.5
TOX (mg/L)	0.065 B	0.23	0.11	0.11 B	16	49	59	58	55
Volatiles (µg/L)									
Benzene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Bromodichloromethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Bromoform	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Bromomethane	<10 J	<10	<10	<10	<5,000 J	<5,000	<10,000	<10,000	<10,000
Carbon Tetrachloride	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Chlorobenzene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Chloroethane	<10 J	<10	<10	<10	<5,000 J	<5,000	<10,000	<10,000	<10,000
2-Chloroethylvinyl ether	<10 J	<50	<50	<50	<5,000 J	<25,000	<50,000	<50,000	<50,000
Chloroform	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Chloromethane	<10 J	<10	<10	<10	<5,000 J	<5,000	<10,000	<10,000	<10,000
Dibromochloromethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,2-Dichlorobenzene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,3-Dichlorobenzene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,4-Dichlorobenzene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,1-Dichloroethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,2-Dichloroethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,1-Dichloroethene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
cis-1,2-Dichloroethylene	<5.0 J	5.5	5.2	5.8	2600 J	4,500	5,700	<5,000	<5,000
trans-1,2-Dichloroethylene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,2-Dichloropropane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
cis-1,3-Dichloropropene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
trans-1,3-Dichloropropene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Ethylbenzene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Methylene chloride	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,1,2,2-Tetrachloroethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Tetrachloroethene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Toluene	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,1,1-Trichloroethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
1,1,2-Trichloroethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Trichloroethene	87 J	130	170	130	53,000 J	90,000	130,000	73,000	78,000
Trichlorofluoromethane	<5.0 J	<5.0	<5.0	<5.0	<2,500 J	<2,500	<5,000	<5,000	<5,000
Vinyl Chloride	<5.0 J	<10	<10	<10	<5,000 J	<5,000	<10,000	<10,000	<10,000

3SEP92 Ba

mg/L - milligrams per liter
µg/L - micrograms per liter

B - Analyte was detected in a "blank" sample.
J - The associated numerical value is an estimated quantity.

* Phenolics, Total Recoverable

^ Replicate Sample of RT-2

Table 5-1. Summary of Analytical Results

Randall Textron Plant Grenada, Mississippi

Parameter	RT-3				RT-003^	RT-4			
Date Sampled:	3/92	4/92	5/92	6/92	5/92	3/92	4/92	5/92	6/92
Metals (mg/L)									
Arsenic	0.120	0.020	0.019	<0.010	0.01	0.023	<0.010	<0.010	<0.050
Barium	1.3	0.20	0.18	0.072	0.12	0.38	0.42	0.13	0.017
Cadmium	<0.025	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium	77	85	81	81	77	0.065	0.073	0.11	0.021
Iron	250	34	27	2.4	13	59	42	7.7	12
Lead	0.15	0.018	0.019	<0.0050	0.01	0.032	0.018	0.0056	0.0073
Manganese	7.2	1.2	1.2	0.35	0.7	1.5	1.5	1.4	1.5
Mercury	0.00047 J	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Selenium	<0.010	<0.010 J	<0.020	<0.010 J	<0.020	<0.050	<0.010 J	<0.020	<0.010 J
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sodium	130	120	110	110	100	80	92	100	120
Miscellaneous Parameters									
pH (units)	6.1 J	6.7 J	6.4 J	6.3 J	6.1 J	6.6 J	6.5 J	6.5 J	7.0 J
Specific Conductance (µmhos/cm)	800	780	790	840	780	460	500	610	690
Chloride (mg/L)	90 J	96	83	82	79	51 J	61	54	60
Fluoride (mg/L)	0.59	0.38	0.38	0.47	0.40	<0.20	<0.20	0.20	0.23
Nitrate (mg/L)	<1.0	<1.0	<1.0	<0.050	<1.0	<0.050	<0.050	0.19	<0.050
Sulfate (mg/L)	92	110	110	110	110	65	92	110	110
Phenolics* (mg/L)	0.052	<0.020	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010
TOC (mg/L)	6.6 B	11	14 B	24	5.5	7.0 B	4.8 B	3.8 B	5.1 B
TOX (mg/L)	31	45	32	40	31	1.1	1.7	2.3	2.5
Volatiles (µg/L)									
Benzene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Bromodichloromethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Bromoform	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Bromomethane	<5,000 J	<5,000	<5,000	<10,000	<5,000	<100 J	<170	<500	<500
Carbon Tetrachloride	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Chlorobenzene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Chloroethane	<5,000 J	<5,000	<5,000	<10,000	<5,000	<100 J	<170	<500	<500
2-Chloroethylvinyl ether	<5,000 J	<25,000	<25,000	<50,000	<25,000	<100 J	<830	<2,500	<2,500
Chloroform	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Chloromethane	<5,000 J	<5,000	<5,000	<10,000	<5,000	<100 J	<170	<500	<500
Dibromochloromethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	260	<250
1,2-Dichlorobenzene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,3-Dichlorobenzene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,4-Dichlorobenzene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,1-Dichloroethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,2-Dichloroethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,1-Dichloroethene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
cis-1,2-Dichloroethylene	4,600 J	3,800	3,900	<5,000	4,000	<50 J	3,000	5,200	4,600
trans-1,2-Dichloroethylene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,2-Dichloropropane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
cis-1,3-Dichloropropene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
trans-1,3-Dichloropropene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Ethylbenzene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Methylene chloride	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,1,2,2-Tetrachloroethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Tetrachloroethene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Toluene	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,1,1-Trichloroethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
1,1,2-Trichloroethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Trichloroethene	77,000 J	52,000	50,000	52,000	52,000	290 J	500	860	650
Trichlorofluoromethane	<2,500 J	<2,500	<2,500	<5,000	<2,500	<50 J	<83	<250	<250
Vinyl Chloride	<5,000 J	<5,000	<5,000	<10,000	<5,000	<100 J	560	1,100	860

3SEP92 Ba

mg/L - milligrams per liter
µg/L - micrograms per liter

B - Analyte was detected in a "blank" sample.
J - The associated numerical value is an estimated quantity.

* Phenolics, Total Recoverable

^ Replicate Sample of RT-3

Table 5-1. Summary of Analytical Results

Randall Textron Plant Grenada, Mississippi

Parameter	RT-5				RT-H†	Rinsate Blank
Date Sampled:	3/92	4/92	5/92	6/92	3/92	3/92
Metals (mg/L)						
Arsenic	0.045	0.029	<0.010	0.011	<0.010	<0.010
Barium	0.35	0.26	0.11	0.15	0.086	<0.010
Cadmium	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chromium	0.058	0.038	<0.010	0.016	<0.010	<0.010
Iron	48	38	1.8	13	14	<0.050
Lead	0.019	0.014	<0.0050	0.0062	<0.0050	<0.0050
Manganese	4.3	4.8	3.1	3	0.15	<0.010
Mercury	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Selenium	<0.010	<0.010 J	<0.020	<0.010 J	<0.010	<0.010
Silver	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Sodium	110	100	87	90	33	<0.50
Miscellaneous Parameters						
pH (units)	6.2 J	7.2 J	6.3 J	6.8 J	7.1 J	6.0
Specific Conductance (µmhos/cm)	770	720	690	670	210	<1.0
Chloride (mg/L)	73 J	79	97	56	15 J	<1.0
Fluoride (mg/L)	0.30	<0.20	<0.20	<0.20	<0.20	<0.20
Nitrate (mg/L)	<0.050	0.11	0.57	<0.050	0.090	<0.050
Sulfate (mg/L)	110	130	150	120	6.2	<5.0
Phenolics* (mg/L)	0.018	<0.020	<0.010	<0.010	<0.010	<0.010
TOC (mg/L)	4.8 B	5.2 B	3.3 B	3.6 B	3.0 B	2.4
TOX (mg/L)	6.5	5.9	5.5	4.5	0.081 B	0.021
Volatiles (µg/L)						
Benzene	<250 J	<250	<250	<250	<5.0	<5.0
Bromodichloromethane	<250 J	<250	<250	<250	<5.0	<5.0
Bromoform	<250 J	<250	<250	<250	<5.0	<5.0
Bromomethane	<500 J	<500	<500	<500	<10	<10
Carbon Tetrachloride	<250 J	<250	<250	<250	<5.0	<5.0
Chlorobenzene	<250 J	<250	<250	<250	<5.0	<5.0
Chloroethane	<500 J	<500	<500	<500	<10	<10
2-Chloroethylvinyl ether	<500 J	<2,500	<2,500	<2,500	<10	<10
Chloroform	<250 J	<250	<250	<250	<5.0	<5.0
Chloromethane	<500 J	<500	<500	<500	<10	<10
Dibromochloromethane	<250 J	<250	<250	<250	<5.0	<5.0
1,2-Dichlorobenzene	<250 J	<250	<250	<250	<5.0	<5.0
1,3-Dichlorobenzene	<250 J	<250	<250	<250	<5.0	<5.0
1,4-Dichlorobenzene	<250 J	<250	<250	<250	<5.0	<5.0
1,1-Dichloroethane	<250 J	<250	<250	<250	<5.0	<5.0
1,2-Dichloroethane	<250 J	<250	<250	<250	<5.0	<5.0
1,1-Dichloroethene	<250 J	<250	<250	<250	<5.0	<5.0
cis-1,2-Dichloroethylene	5,400 J	4,800	4,300	3,000	<5.0	<5.0
trans-1,2-Dichloroethylene	<250 J	<250	<250	<250	<5.0	<5.0
1,2-Dichloropropane	<250 J	<250	<250	<250	<5.0	<5.0
cis-1,3-Dichloropropene	<250 J	<250	<250	<250	<5.0	<5.0
trans-1,3-Dichloropropene	<250 J	<250	<250	<250	<5.0	<5.0
Ethylbenzene	<250 J	<250	<250	<250	<5.0	<5.0
Methylene chloride	<250 J	<250	<250	<250	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<250 J	<250	<250	<250	<5.0	<5.0
Tetrachloroethene	<250 J	<250	<250	<250	<5.0	<5.0
Toluene	<250 J	<250	<250	<250	<5.0	<5.0
1,1,1-Trichloroethane	<250 J	<250	<250	<250	<5.0	<5.0
1,1,2-Trichloroethane	<250 J	<250	<250	<250	<5.0	<5.0
Trichloroethene	7,000 J	7,700	9,400	4,900	<5.0	<5.0
Trichlorofluoromethane	<250 J	<250	<250	<250	<5.0	<5.0
Vinyl Chloride	<500 J	<500	<500	<500	<5.0	<5.0

3SEP92 Ba

mg/L - milligrams per liter
µg/L - micrograms per liter

B - Analyte was detected in a "blank" sample.
J - The associated numerical value is an estimated quantity.

* Phenolics, Total Recoverable

† Sample collected from fire hydrant.

Table 5-1. Summary of Analytical Results

Randall Textron Plant Grenada, Mississippi

Parameter	Field Blank				Trip Blank			
Date Sampled:	3/92	4/92	5/92	6/92	3/92	4/92	5/92	6/92
Metals (mg/L)								
Arsenic	<0.010	<0.010	<0.010	<0.010	—	—	—	—
Barium	<0.010	<0.010	<0.010	<0.010	—	—	—	—
Cadmium	<0.0050	<0.0050	<0.0050	<0.0050	—	—	—	—
Chromium	<0.010	<0.010	<0.010	<0.010	—	—	—	—
Iron	<0.050	<0.050	<0.050	<0.050	—	—	—	—
Lead	<0.0050	<0.0050	<0.0050	<0.0050	—	—	—	—
Manganese	<0.010	<0.010	<0.010	<0.010	—	—	—	—
Mercury	<0.00020	<0.00020	<0.00020	0.00045	—	—	—	—
Selenium	<0.010	<0.010	<0.020	<0.010	—	—	—	—
Silver	<0.010	<0.010	<0.010	<0.010	—	—	—	—
Sodium	<0.50	0.50	<0.50	<0.50	—	—	—	—
Miscellaneous Parameters								
pH (units)	5.9	6.5	8.4	6.2	—	—	—	—
Specific Conductance (µmhos/cm)	<1.0	3.2	3.4	2.1	—	—	—	—
Chloride (mg/L)	<1.0	<1.0	<1.0	<1.0	—	—	—	—
Fluoride (mg/L)	<0.20	<0.20	<0.20	<0.20	—	—	—	—
Nitrate (mg/L)	<0.050	<0.050	<0.050	<0.050	—	—	—	—
Sulfate (mg/L)	<5.0	<5.0	<5.0	<5.0	—	—	—	—
Phenolics* (mg/L)	<0.010	<0.020	<0.010	<0.010	—	—	—	—
TOC (mg/L)	4.1	2.2	1.1	1.7	—	—	—	—
TOX (mg/L)	<0.010	0.016	<0.010	0.027	—	—	—	—
Volatiles (µg/L)								
Benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane	<10	<10	<10	<10	<10	<10	<10	<10
Carbon Tetrachloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane	<10	<10	<10	<10	<10	<10	<10	<10
2-Chloroethylvinyl ether	<10	<50	<50	<50	<10	<50	<50	<50
Chloroform	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane	<10	<10	<10	<10	<10	<10	<10	<10
Dibromochloromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,2-Dichloroethylene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-Dichloropropene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene chloride	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride	<5.0	<10	<10	<10	<10	<10	<10	<10

3SEP92 Ba

mg/L - milligrams per liter
µg/L - micrograms per liter

* Phenolics, Total Recoverable

Table 6-1. Summary of Statistical Test Conducted for Each Parameter Detected

Randall Textron Plant Grenada, Mississippi

Parameter	Non Transformed	Transformed		Result of ANOVA	Bonferroni T-Test	Bonferroni Results	
	One Way Parametric ANOVA	One Way Parametric ANOVA on Natural Log Concentration	One Way Parametric ANOVA on Natural Log Concentration Multiplied			RT-4	RT-5
Arsenic	•		x 1000	Not Significant			
Barium	•		x 100	Not Significant			
Chromium	•		x 1000	Significant	•	SD	SD
Iron		•		Not Significant			
Lead	•		x 1000	Not Significant			
Sodium	•			Significant	•	NSD	NSD
pH	•			Not Significant			
Specific Conductance	•			Significant	•	SD	NSD
Chloride	•			Significant	•	SD	NSD
Fluoride	•			Significant	•	SD	NSD
Nitrate	•		x 100	Significant	•	NSD	NSD
Sulfate	•			Significant	•	NSD	SD
Phenolics	•			Not Significant			
TOC	•			Significant	•	NSD	NSD
TOX	•		x 100	Significant	•	SD	NSD
cis-1,2-Dichloroethene *	•			Significant	•	NSD	NSD
Trichloroethene		•		Significant	•	SD	SD
Vinyl Chloride *		•		Significant	•	NSD	NSD

3SEP92 Ba

• Test Conducted

* Values reported as less than a detection limit were replaced by a value equal to 1/2 that detection limit for these ANOVAs.

SD - Mean concentration in this well is significantly different than upgradient well.

NSD - Mean concentration in this well is not significantly different than upgradient well.

Table 6-2. Summary of Statistically Significant ANOVAs

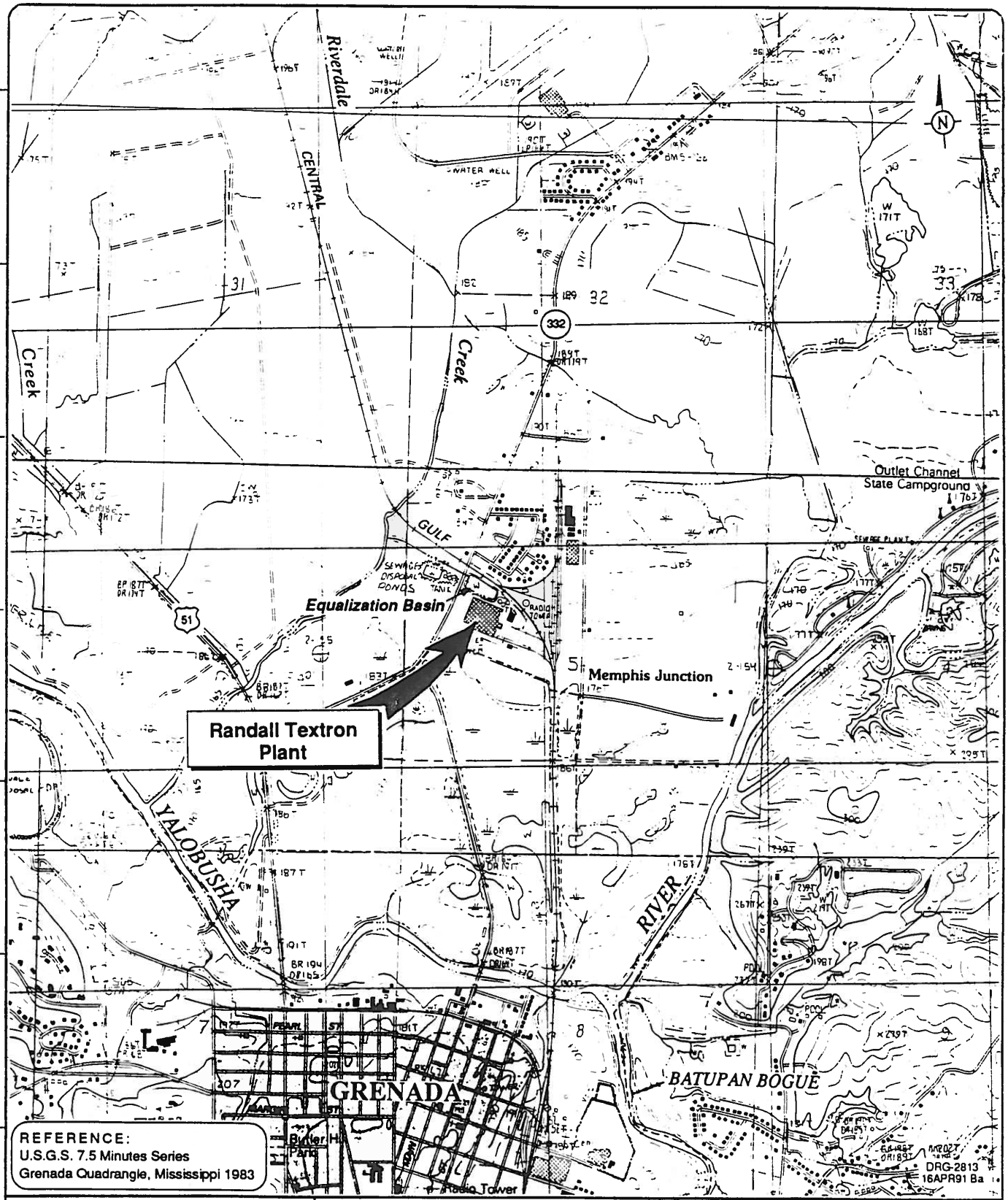
Randall Textron Plant Grenada, Mississippi

Parameter	Units	Calculated F Statistic	Critical F (alpha = 0.05)	Upgradient Mean	Downgradient Mean RT-4	Downgradient Mean RT-5	Comments
Chromium *	(mg/L)	148	3.06	8.53	4.05	3.19	Statistically significant ANOVA due to higher upgradient concentration than in downgradient wells.
Sodium	(mg/L)	6.3	3.06	95.88	98.00	96.75	Not significantly higher in either downgradient well. Significant due to variation among upgradient wells.
Specific Conductance	(µmhos/cm)	7.8	3.06	665.83	565.00	713.00	Statistically significant ANOVA due to higher concentrations in upgradient wells than RT-4.
Chloride	(mg/L)	16.7	3.06	82.04	56.50	76.25	Statistically significant ANOVA due to higher upgradient concentration than in RT-4.
Fluoride	(mg/L)	16.2	3.06	0.29	0.21	0.24	Statistically significant ANOVA due to higher upgradient concentration than in RT-4.
Nitrate *	(mg/L)	6.6	3.06	2.25	1.94	2.42	Not significantly higher in either downgradient well. Significant due to variation among upgradient wells.
Sulfate	(mg/L)	4.6	3.06	97.96	94.25	127.50	Significantly higher concentration in RT-5 than upgradient concentration.
TOC	(mg/L)	3.4	3.06	8.64	5.18	4.23	Not significantly higher in either downgradient well. Significant due to variation among upgradient wells.
TOX *	(mg/L)	137.9	3.06	6.32	5.20	6.32	Statistically significant ANOVA due to higher upgradient concentration than in RT-4.
cis-1,2-Dichloroethene	(µg/L)	4.2	3.06	2755.89	2087.50	3656.25	Not significantly higher in either downgradient well. Significant due to variation among upgradient wells.
Trichloroethene *	(µg/L)	298.4	3.06	9.04	6.28	8.86	Statistically significant ANOVA due to higher upgradient concentration than downgradient wells.
Vinyl Chloride *	(µg/L)	61.2	3.06	5.93	6.00	5.52	Not significantly higher in either downgradient well. Significant due to variation among upgradient wells.

4SEP92 Ba

* Results are for ANOVA performed on the natural logarithm of concentrations.

FIGURES



DRAWING DATE: 3SEP92 Ba | PROJECT NO.: TN20001 | FILE NAME: RCRA DETECTION | DRAWING NO.: 90-2813 | CHECKED: | APPROVED: A. MOTLEY | DRAFTER: B. ALTOM

SCALE 0 2500 ft

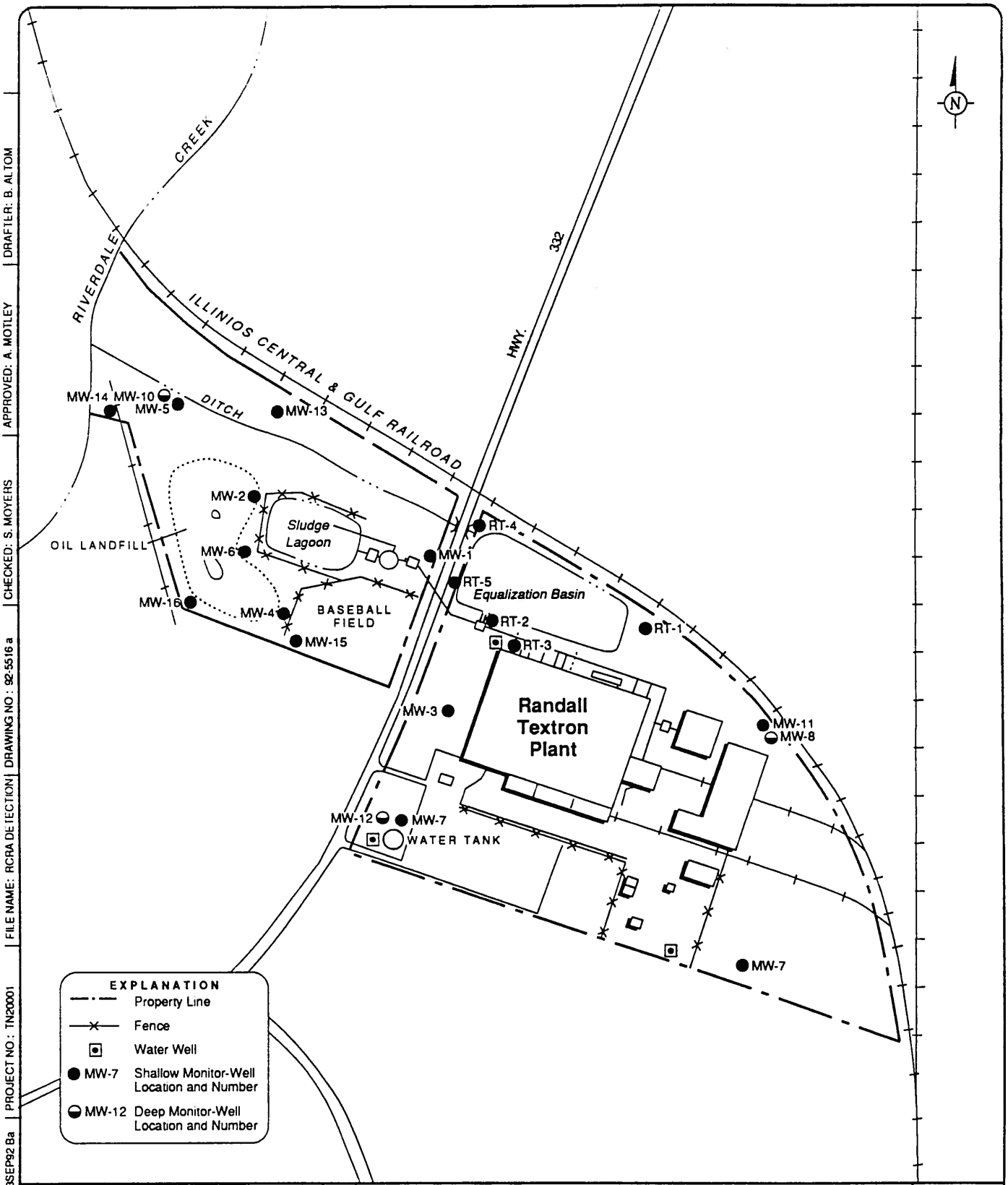
GERAGHTY & MILLER, INC.
Environmental Services

Regional Location Map

Randall Textron Plant Grenada, Mississippi

FIGURE

2-1



DRAWING DATE: 3SEP92 Ba | PROJECT NO.: TN20001 | FILE NAME: RCRA DETECTION | DRAWING NO.: 92-5516 a | CHECKED: S. MOYERS | APPROVED: A. MOTLEY | DRAFTER: B. ALTOM

GERAGHTY & MILLER, INC.
Environmental Services

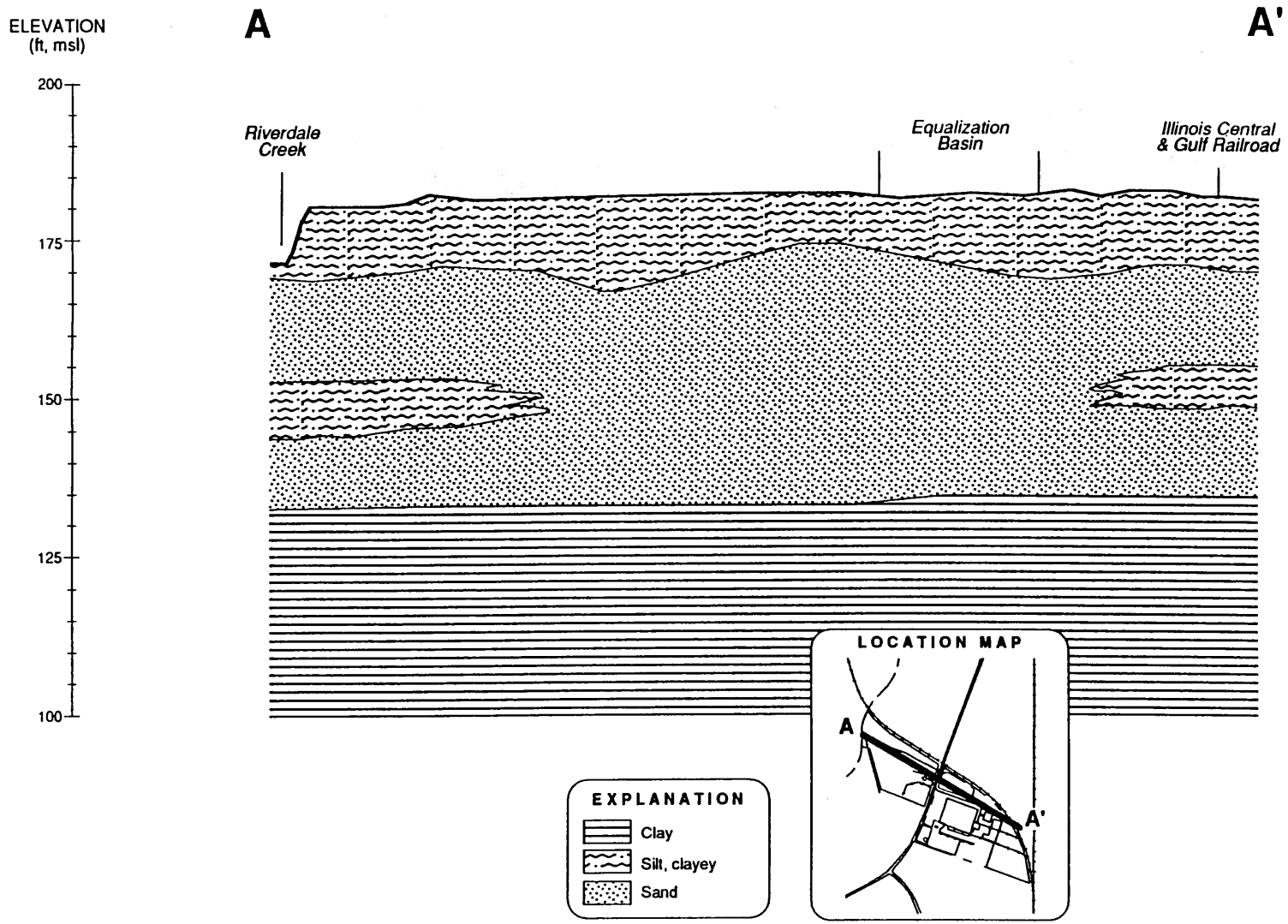
Site Map

Randall Textron Plant Grenada, Mississippi

FIGURE

2-2

DRAWING DATE: 3SEP92 Ba	PROJECT NO.: TN20001	FILE NAME: RCRA DETECTION	DRAWING NO.: 92-5525	CHECKED:	APPROVED: A. MOTLEY	DRAFTER: S. BAKER



APPROXIMATE HORIZONTAL SCALE 0 400 ft

GERAGHTY & MILLER, INC.
Environmental Services

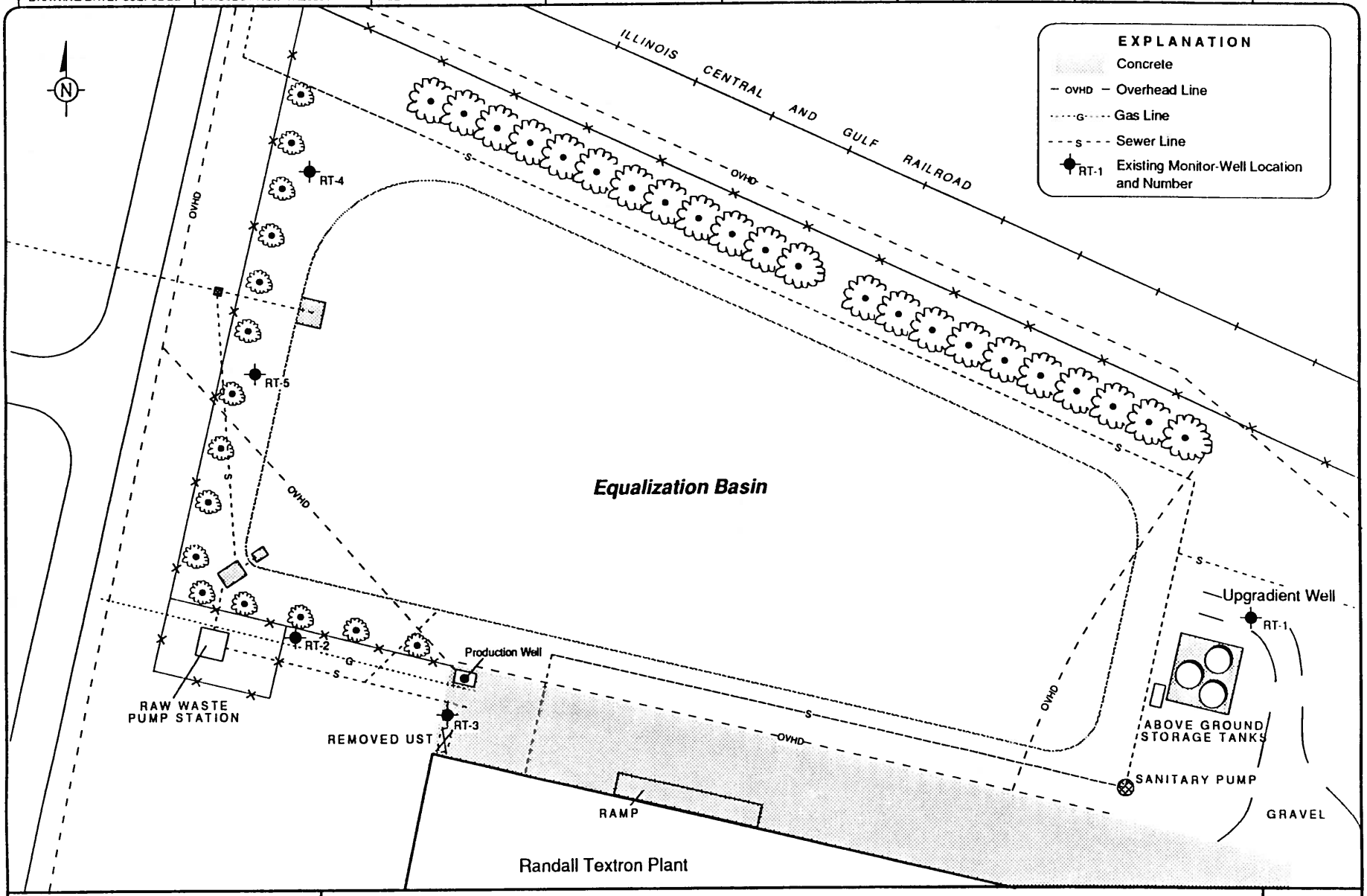
Generalized Geologic Cross-Section A-A'

Randall Textron Plant Grenada, Mississippi

FIGURE

3-1

DRAWING DATE: 3SEP92 Ba | PROJECT NO.: TN20001 | FILE NAME: RCRA DETECTION | DRAWING NO.: 91-5079 a | CHECKED: S. MOYERS | APPROVED: A. MOTLEY | DRAFTER: B. ALTOM



SCALE 0 (approximate) 75 ft

GERAGHTY & MILLER, INC.
Environmental Services

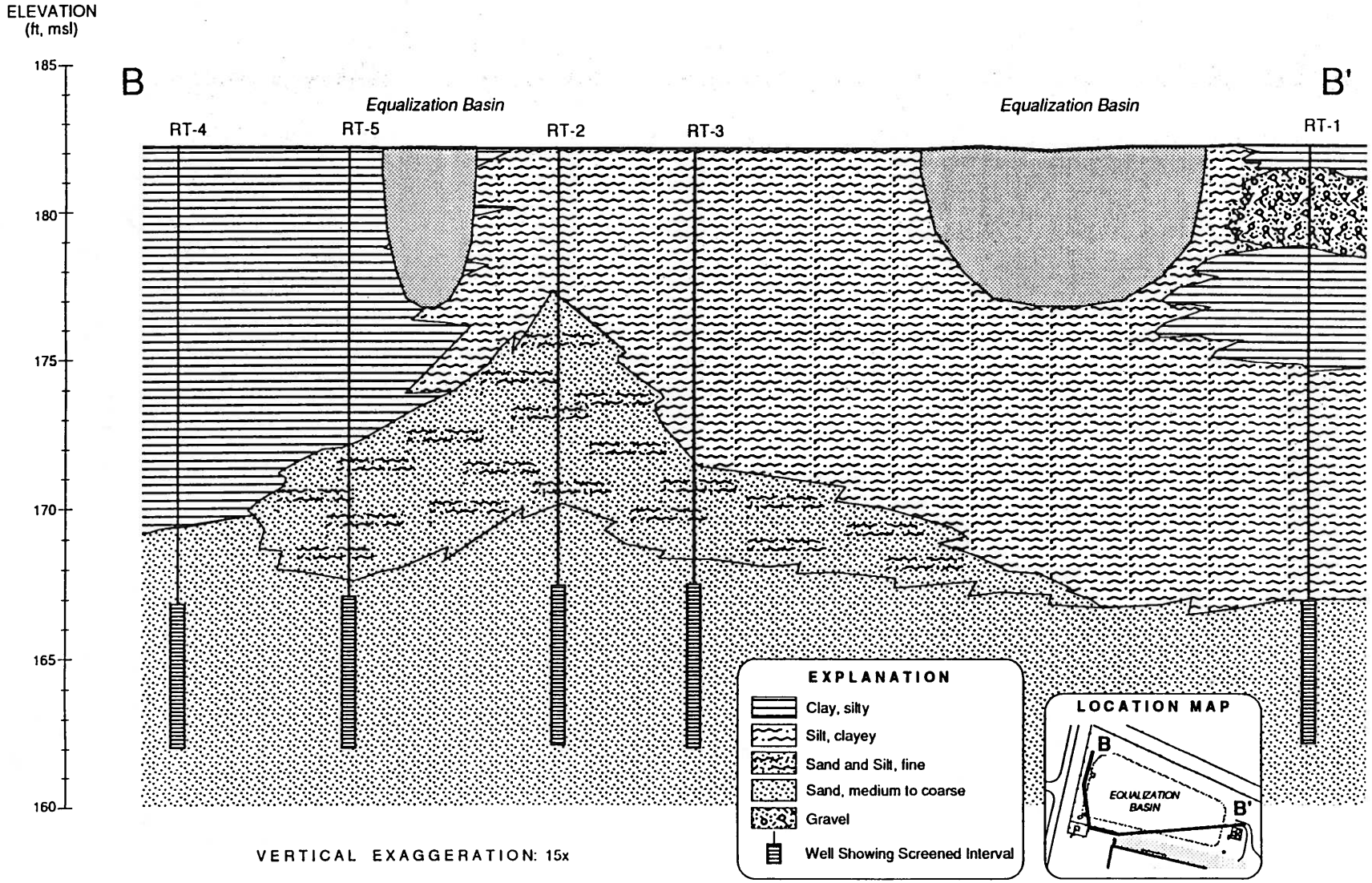
Monitor-Well Locations

Randall Textron Plant Grenada, Mississippi

FIGURE

3-2

DRAWING DATE: 3SEP92 Ba	PROJECT NO.: TN20001	FILE NAME: RCRA DETECTION	DRAWING NO: 92-5522	CHECKED: S. MOYERS	APPROVED: A. MOTLEY	DRAFTER: S. BAKER



HORIZONTAL SCALE 0 75 ft

GERAGHTY & MILLER, INC.
Environmental Services

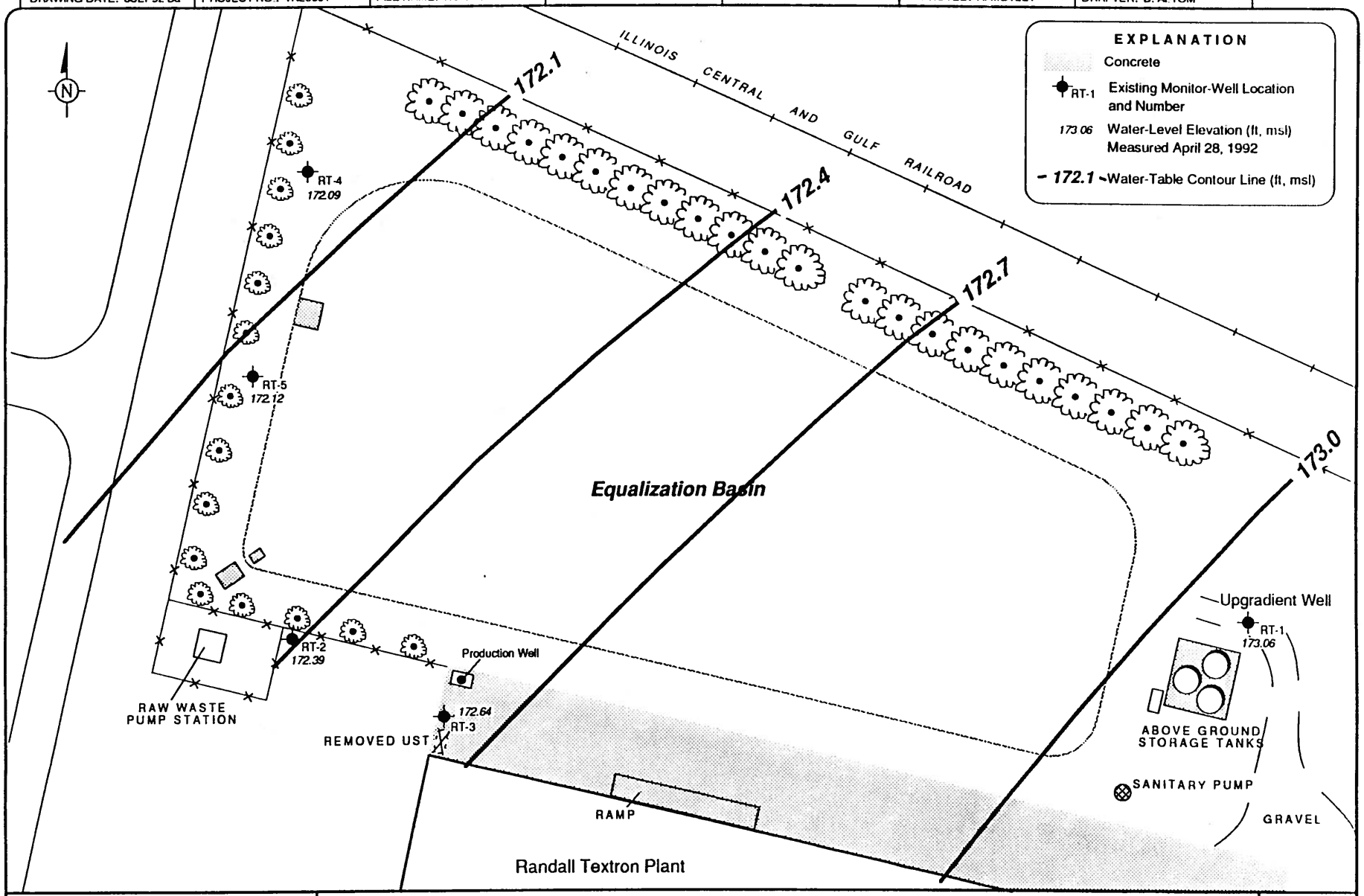
Geologic Cross-Section B-B' at the Equalization Basin

Randall Textron Plant Grenada, Mississippi

FIGURE

3-3

DRAWING DATE: 3SEP92 Ba	PROJECT NO.: TN20001	FILE NAME: RCRA DETECTION	DRAWING NO.: 91-5079 b	CHECKED: S. MOYERS	APPROVED: A. MOTLEY	DRAFTER: B. ALTOM



SCALE 0 (approximate) 75 ft

GERAGHTY & MILLER, INC.
Environmental Services

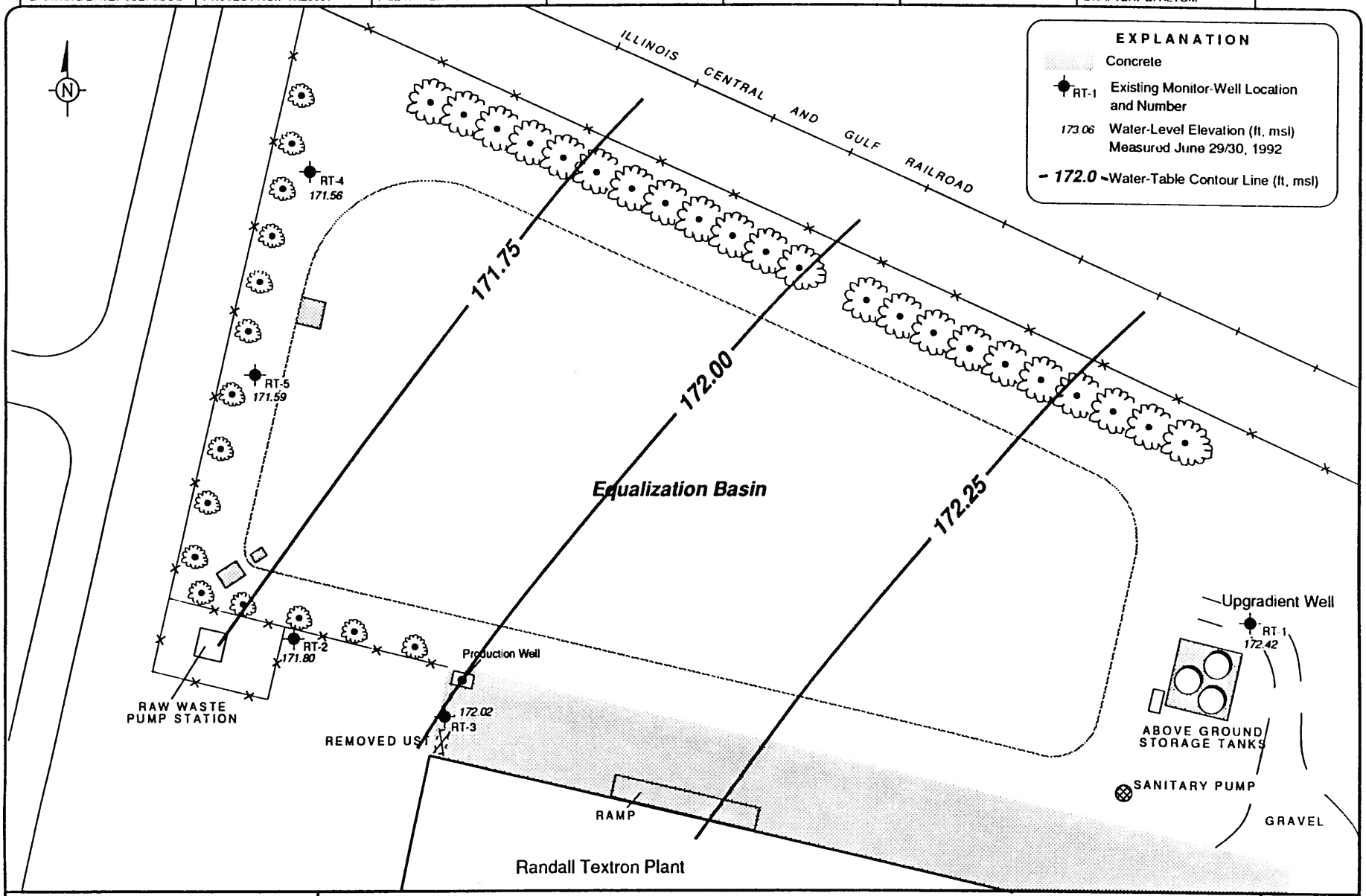
Water-Table Contour Map, April 1992

Randall Textron Plant Grenada, Mississippi

FIGURE

3-4

DRAWING DATE: 3SEP92 Ba | PROJECT NO.: TN20001 | FILE NAME: RCRA DETECTION | DRAWING NO.: 91-5079 c | CHECKED: S MOYERS | APPROVED: A. MOTLEY | DRAFTER: B. ALTOM



SCALE 0 (approximate) 75 ft

GERAGHTY & MILLER, INC.
Environmental Services

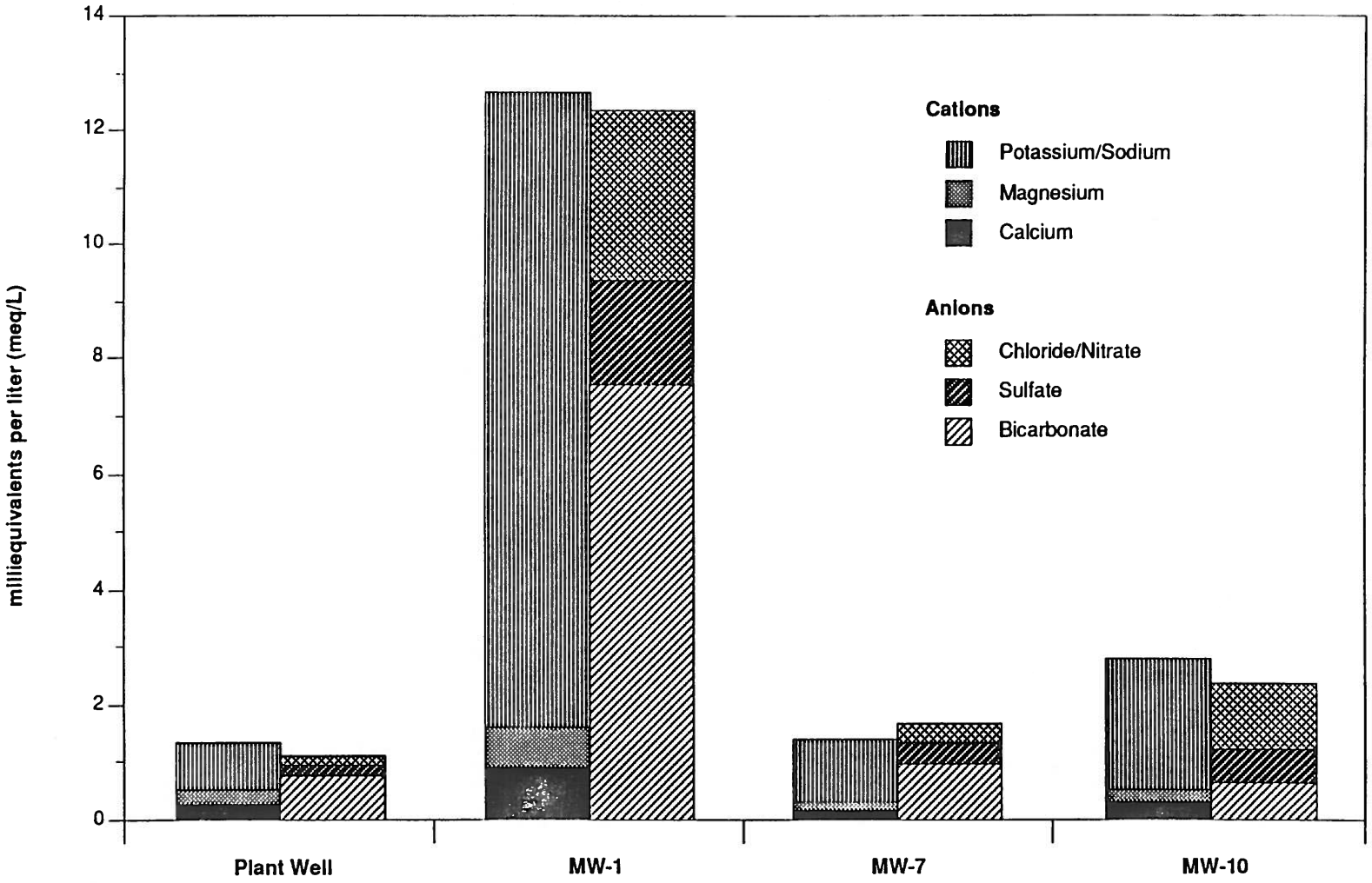
Water-Table Contour Map, June 1992

Randall Textron Plant Grenada, Mississippi

FIGURE

3-5

DRAWING DATE: 3SEP92 Ba	PROJECT NO.: TN20001	FILE NAME: RCRA DETECTION	DRAWING NO: 92-5513	CHECKED:	APPROVED: A. MOTLEY	DRAFTER: B. ALTOM



NOTE: Ground-water samples collected by Eckenfelder, Inc., August and December 1991

GERAGHTY & MILLER, INC.
Environmental Services

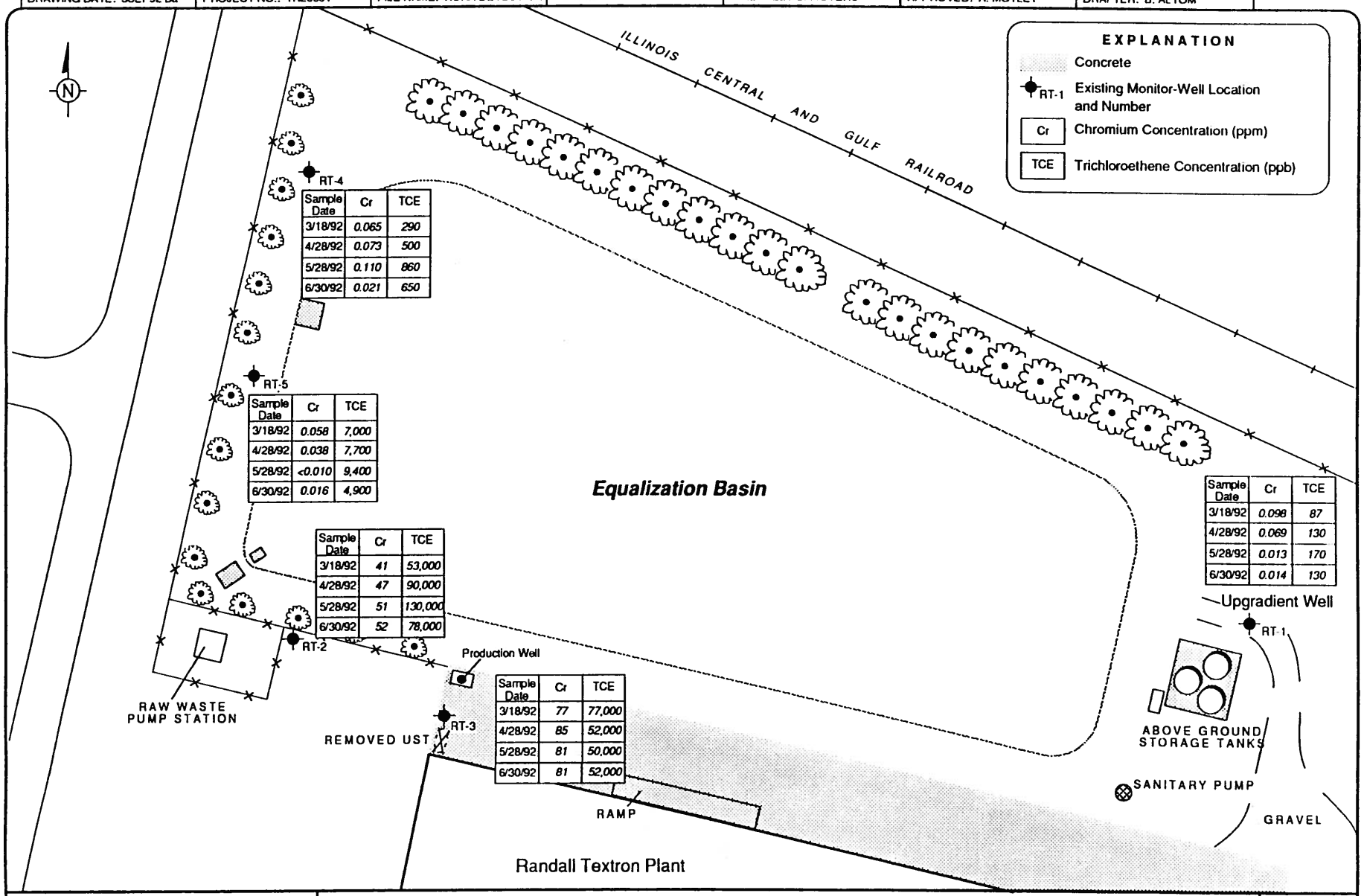
Composition of Ground Water

Randall Textron Plant Grenada, Mississippi

FIGURE

5-1

DRAWING DATE: 3SEP92 Ba	PROJECT NO.: TN20001	FILE NAME: RCRA DETECTION	DRAWING NO.: 91-5079 d	CHECKED: S. MOYERS	APPROVED: A. MOTLEY	DRAFTER: B. ALTOM



SCALE 0 (approximate) 75 ft

GERAGHTY & MILLER, INC.
Environmental Services

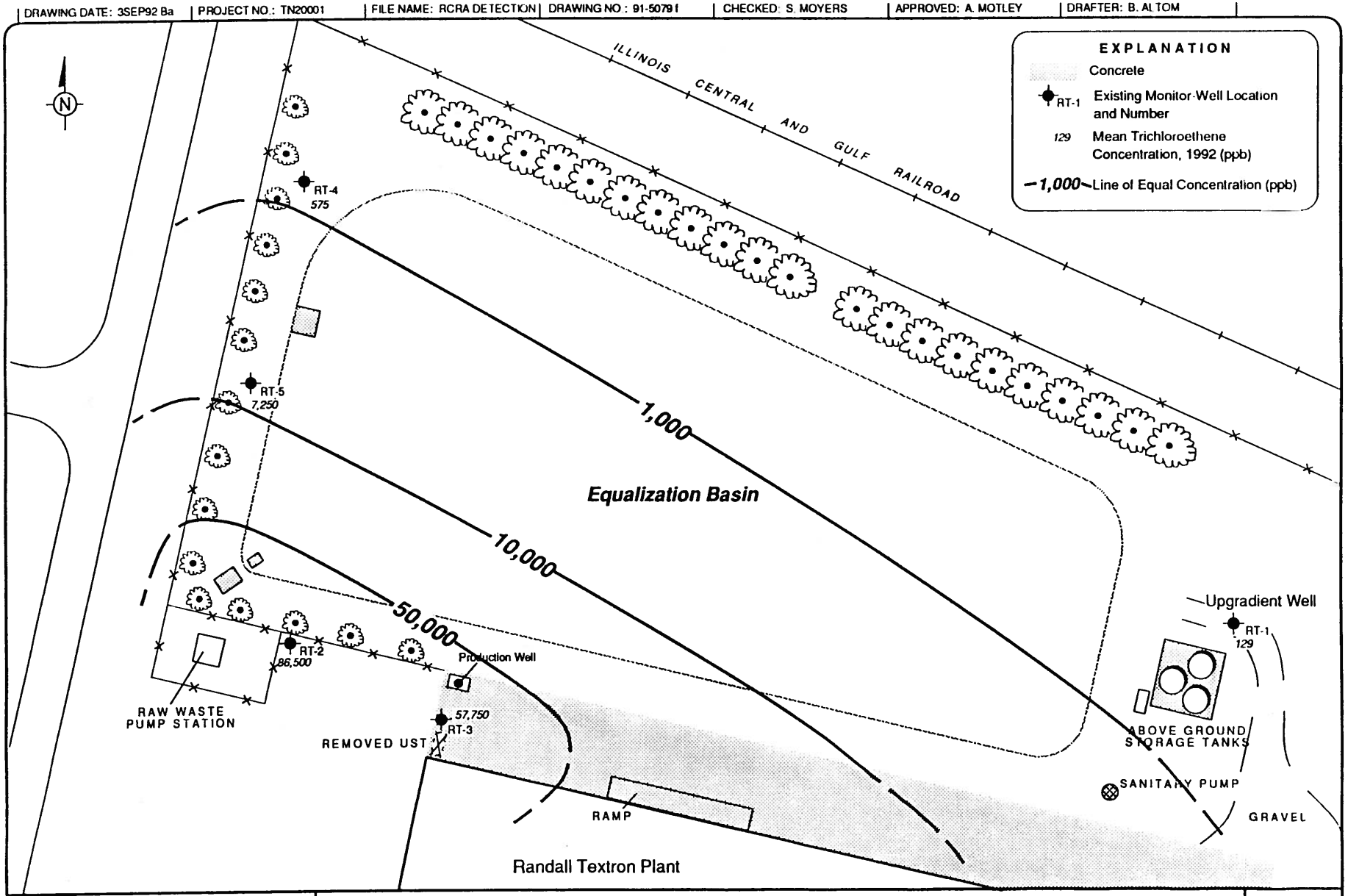
Concentrations of Chromium and Trichloroethene Detected in Ground Water

Randall Textron Plant Grenada, Mississippi

FIGURE

5-2

DRAWING DATE: 3SEP92 Ba | PROJECT NO.: TN20001 | FILE NAME: RCRA DETECTION | DRAWING NO: 91-5079 f | CHECKED: S. MOYERS | APPROVED: A. MOTLEY | DRAFTER: B. ALTOM



SCALE 0 (approximate) 75 ft

GERAGHTY & MILLER, INC.
Environmental Services

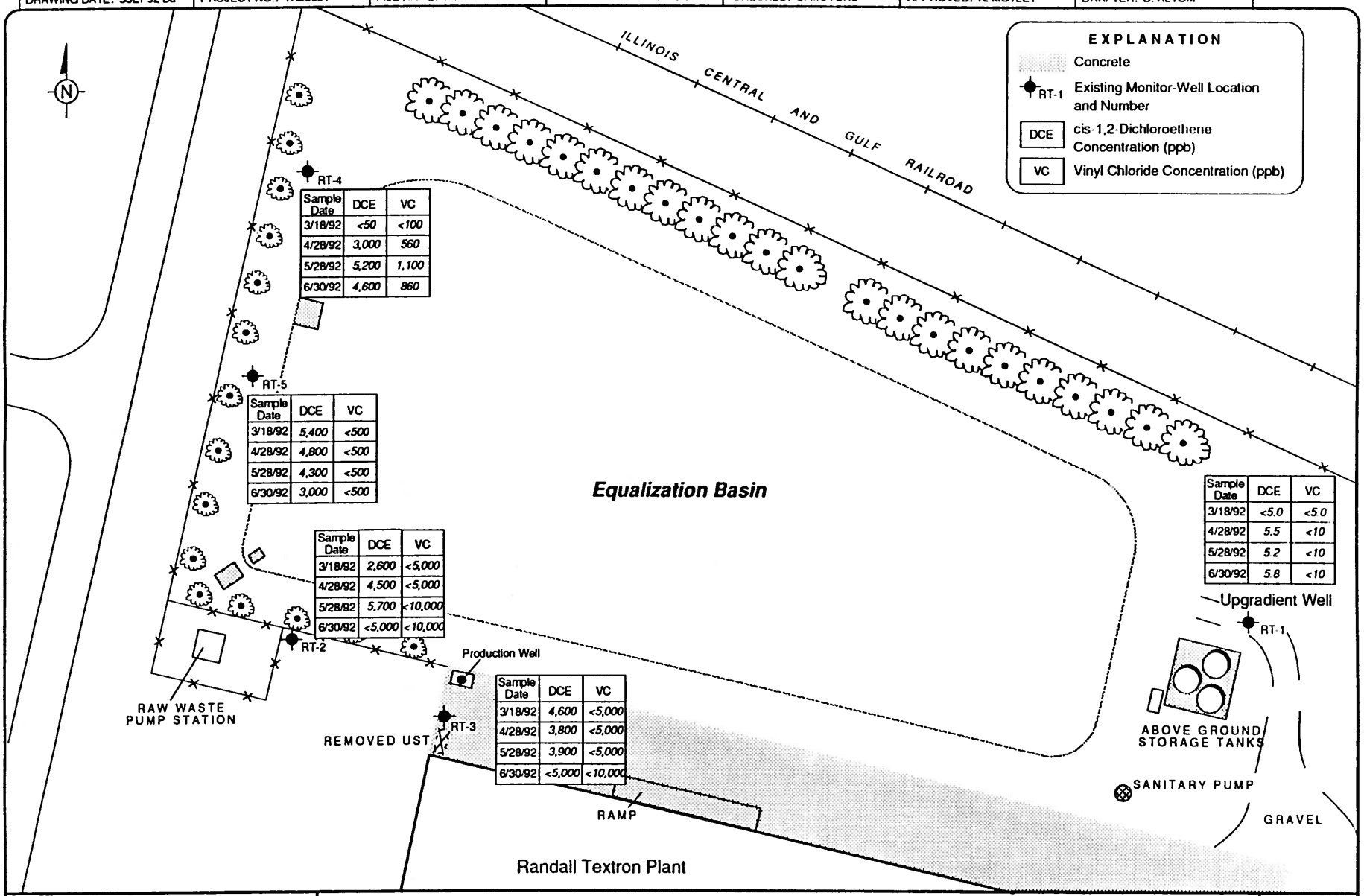
Distribution of Trichloroethene in Shallow Ground Water

Randall Textron Plant Grenada, Mississippi

FIGURE

5-3

DRAWING DATE: 3SEP92 Ba	PROJECT NO.: TN20001	FILE NAME: RCRA DETECTION	DRAWING NO.: 91-5079 e	CHECKED: S. MOYERS	APPROVED: A. MOTLEY	DRAFTER: B. ALTOM



SCALE 0 (approximate) 75 ft

GERAGHTY & MILLER, INC.
Environmental Services

Concentrations of cis-1,2-Dichloroethene and Vinyl Chloride Detected in Ground Water

Randall Textron Plant Grenada, Mississippi

FIGURE

5-4

APPENDIX A

BORING LOGS

GERAGHTY & MILLER, INC.
Environmental Services

BORING LOG

BORING NO. **RT-1**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	TOTAL DEPTH
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	20.0 ft
GEOLOGIST	**SAMPLE FREQUENCY**	**SAMPLE TYPE**	**DATE BORING COMPLETED**
S. Moyers	Continuous	Split Spoon	December 17, 1991
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
C. Odom	Envirotech	Hollow-Stem Auger	CME-75

SAMPLE TYPE: CONTINUOUS | SPLIT SPOON | NO SAMPLE RECOVERED

DEPTH IN FEET	INTERVAL	SAMPLE	GRAPHIC LOG	DESCRIPTION	COMMENTS	TIP
0						
		1		CLAY, silty, dark brown, soft.		3.0
				GRAVEL, coarse.		
		2		CLAY, silty, sandy, gray; pebbles.		3.7
5		3			Wet	3.6
		4				5.5
				SILT, clayey, gray with brown mottling, stiff.		
		5				3.0
10		6				3.2
		7				5.3
15		8		15.0' - 16.0' Sand and silt, fine-grained.		3.3
		9		SAND, medium-grained, fairly well-rounded and sorted.	Very wet	3.5
		10		18.0' - 20.0' Increasing clay content, dark maroonish-brown.		3.5
20					End of boring at 20.0 ft	
25						

29APR92 Ba **FORM 395**

GERAGHTY & MILLER, INC.
Environmental Services

BORING LOG

BORING NO. **RT-2**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	TOTAL DEPTH
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	20.0 ft
GEOLOGIST	**SAMPLE FREQUENCY**	**SAMPLE TYPE**	**DATE BORING COMPLETED**
S. Moyers	Continuous	Split Spoon	December 17, 1991
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
C. Odom	Envirotech	Hollow-Stem Auger	CME-75

SAMPLE TYPE: CONTINUOUS | SPLIT SPOON | NO SAMPLE RECOVERED

DEPTH IN FEET	INTERVAL	SAMPLE	GRAPHIC LOG	DESCRIPTION	COMMENTS	TIP
0						
		1		SILT, clayey, brown with gray mottling.		11.4
		2				20.8
5		3				79.0
		4		SAND, fine-grained, silty, tan.		19.6
		5		8.0' - 12.0' Decreasing in silt content.	Wet	100
10		6				169
		7		12.0' - 20.0' Medium- to coarse-grained, fairly well-rounded and sorted.		391
15		8				693
		9				383
		10				182
20					End of boring at 20.0 ft	
25						

GERAGHTY & MILLER, INC.
Environmental Services

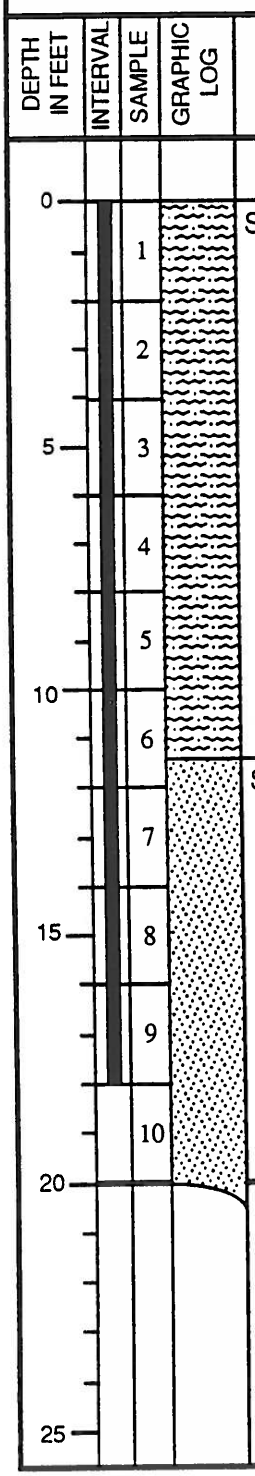
BORING LOG

BORING NO. **RT-3**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	TOTAL DEPTH
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	20.0 ft
GEOLOGIST	**SAMPLE FREQUENCY**	**SAMPLE TYPE**	**DATE BORING COMPLETED**
S. Moyers	Continuous	Split Spoon	December 18, 1991
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
C. Odom	Envirotech	Hollow-Stem Auger	CME-75

SAMPLE TYPE: CONTINUOUS | SPLIT SPOON | NO SAMPLE RECOVERED



DESCRIPTION	COMMENTS	TIP
SILT, clayey, brown; with fine-grained sand.	Moist	1.7
		1.8
5.0' - 11.5' Clayey, brown with tan mottling, stiff.		2.0
		2.0
		2.1
	Wet	2.1
SAND, fine-grained, gray.		2.3
14.0' - 20.0' Fine- to medium-grained, brownish-tan; some silt and clay.		2.5
		2.5
		No Recovery
	End of boring at 20.0 ft	

GERAGHTY & MILLER, INC.
Environmental Services

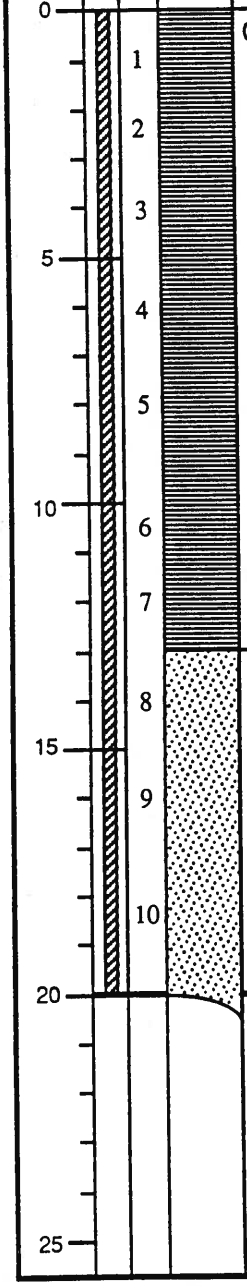
BORING LOG

BORING NO. **RT-4**

PROJECT Equalization Basin RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	TOTAL DEPTH
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	20.0 ft
GEOLOGIST	**SAMPLE FREQUENCY**	**SAMPLE TYPE**	**DATE BORING COMPLETED**
S. Moyers	Continuous	Continuous Sampler	March 17, 1992
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
C. Lee	TTL, Inc.	Hollow-Stem Auger	CME-550

SAMPLE TYPE: CONTINUOUS | SPLIT SPOON | NO SAMPLE RECOVERED



DESCRIPTION	COMMENTS	TIP
CLAY, silty, brown with gray mottling.		1.2
		0
		0.8
5.0' - 6.5' Gray, sticky.	Wet	0.3
6.5' - 13.0' Medium brown.		0.3
		1.0
		2.4
SAND, medium-grained, gray.	Wet	11.0
16.0' - 20.0' Coarse-grained, fairly well-rounded and sorted.		14.3
		47.5
	End of boring at 20.0 ft	

GERAGHTY & MILLER, INC.
Environmental Services

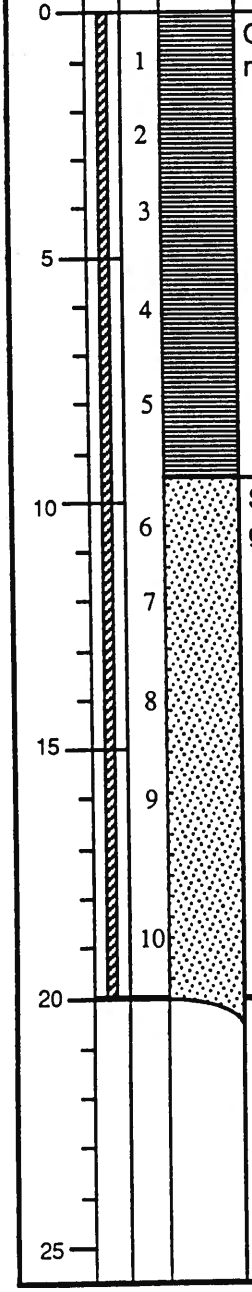
BORING LOG

BORING NO. **RT-5**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	TOTAL DEPTH
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	20.0 ft
GEOLOGIST	**SAMPLE FREQUENCY**	**SAMPLE TYPE**	**DATE BORING COMPLETED**
S. Moyers	Continuous	Continuous Sampler	March 17, 1992
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
C. Lee	TTL, Inc.	Hollow-Stem Auger	CME-550

SAMPLE TYPE: CONTINUOUS | SPLIT SPOON | NO SAMPLE RECOVERED



DESCRIPTION	COMMENTS	TIP
CLAY, silty, brown with gray and yellowish-brown mottling.		0.1 0 0 0 0.1
SAND, fine-grained, brown; with stringers of grayish-brown silty clay (≤0.05 ft thick).	Wet	11.2 24.2
14.5' - 16.0' Medium-grained, brown.		38.6
16.0' - 20.0' Medium- to coarse-grained, brown, fairly well-rounded and sorted.		53.9 54.7
	End of boring at 20.0 ft	

19MAY92 Ba **FORM 395**

APPENDIX B

WELL-CONSTRUCTION DIAGRAMS

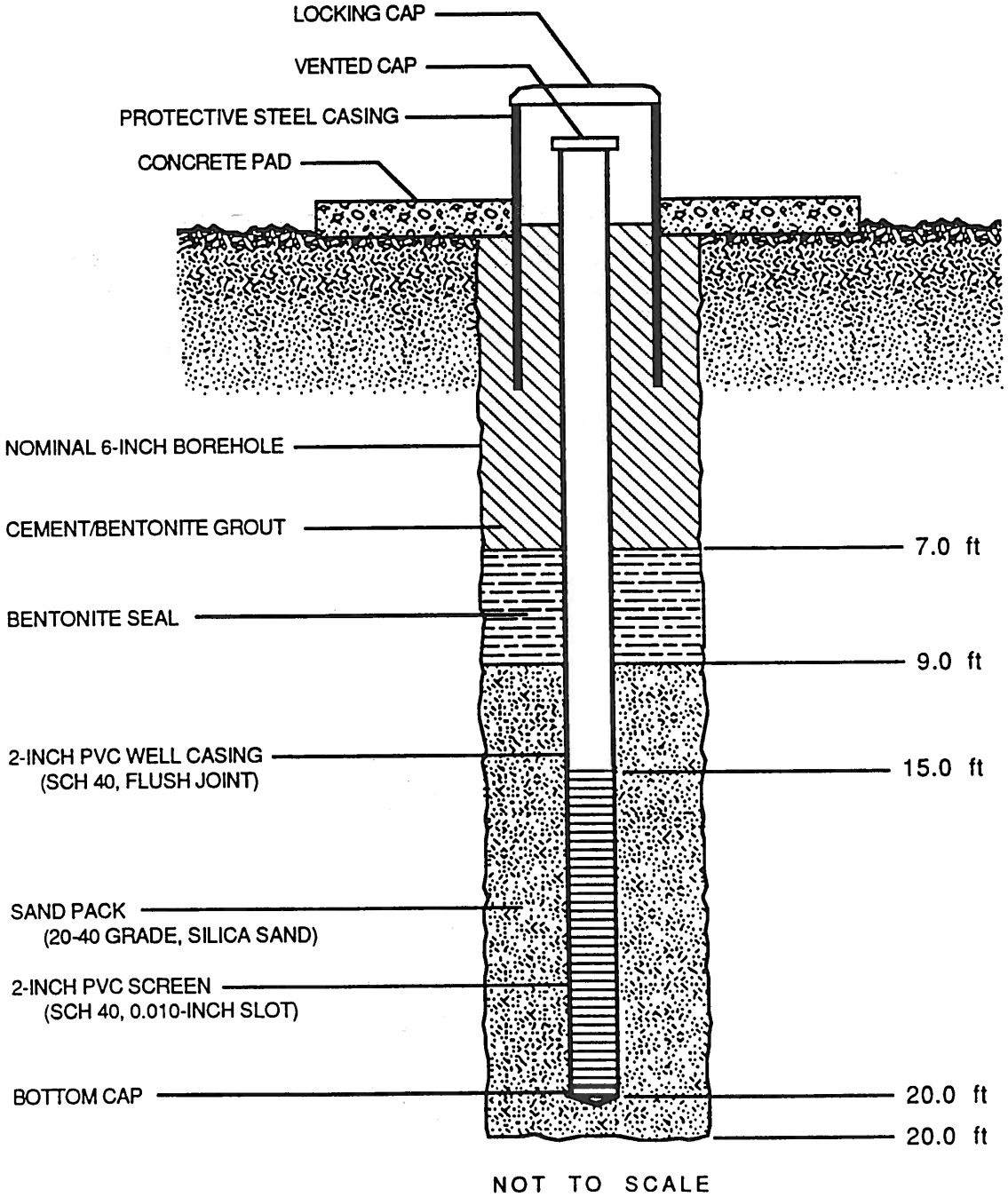
GERAGHTY & MILLER, INC.
Environmental Services

WELL-CONSTRUCTION DIAGRAM

WELL NO. **RT-1**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	185.18 ft, msl
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
S. Moyers	Envirotech	Hollow-Stem Auger	CME-75
DEVELOPMENT METHOD	**VOLUME EVACUATED**	**DATE WELL COMPLETED**	**FORMATION MONITORED**
Hand Bail/Centrifugal Pump	~75 gallons	December 19, 1991	Unconsolidated Zone



NOT TO SCALE

NOTE: All depth measurements in feet above/below ground surface.

27MAY92 Ba

FORM 408

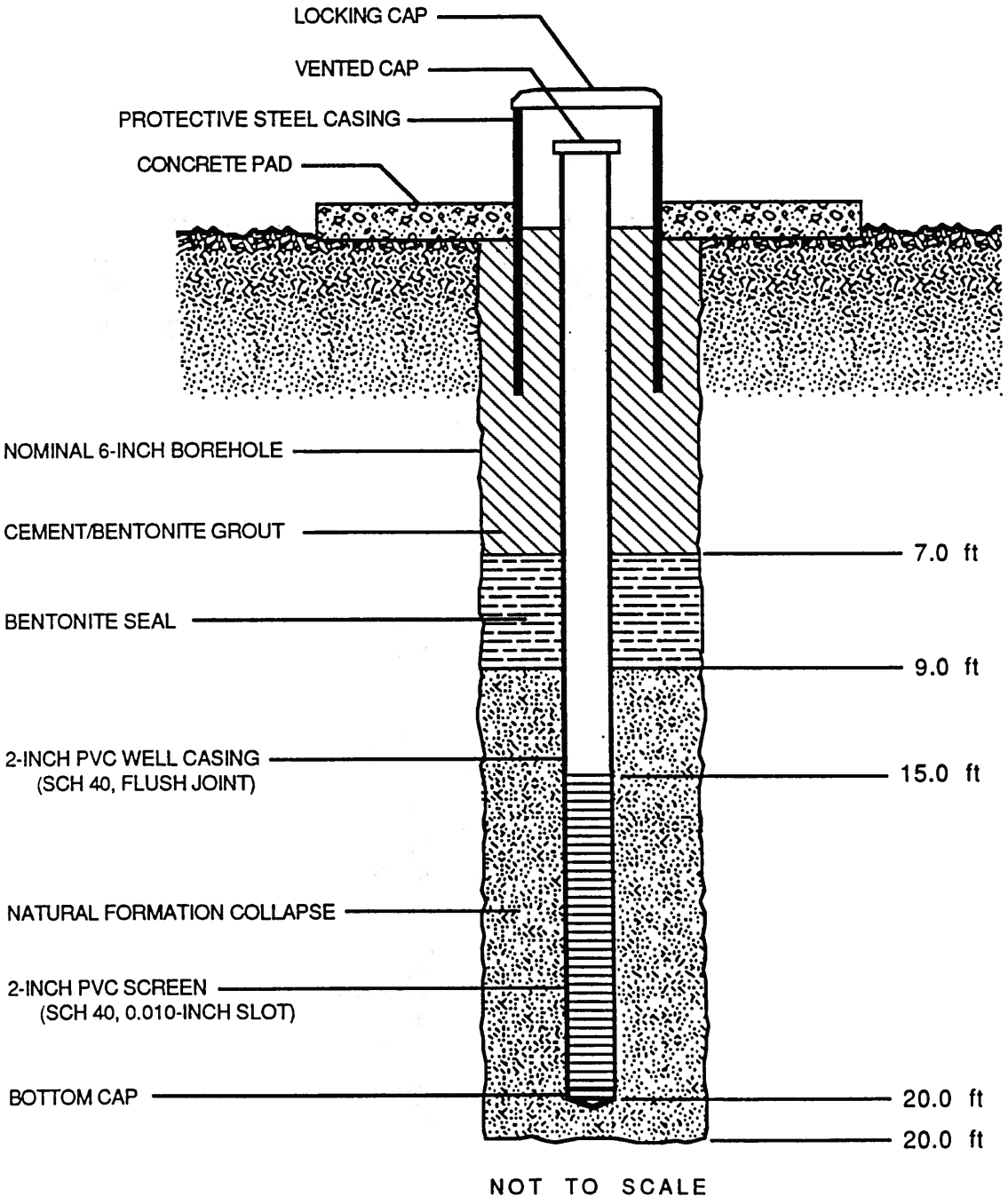
GERAGHTY & MILLER, INC.
Environmental Services

WELL-CONSTRUCTION DIAGRAM

WELL NO. **RT-2**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	184.56 ft, msl
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
S. Moyers	Envirotech	Hollow-Stem Auger	CME-75
DEVELOPMENT METHOD	**VOLUME EVACUATED**	**DATE WELL COMPLETED**	**FORMATION MONITORED**
Centrifugal Pump	100 gallons	December 19, 1991	Unconsolidated Zone



NOT TO SCALE

NOTE: All depth measurements in feet above/below ground surface.

27MAY92 Ba

FORM 408

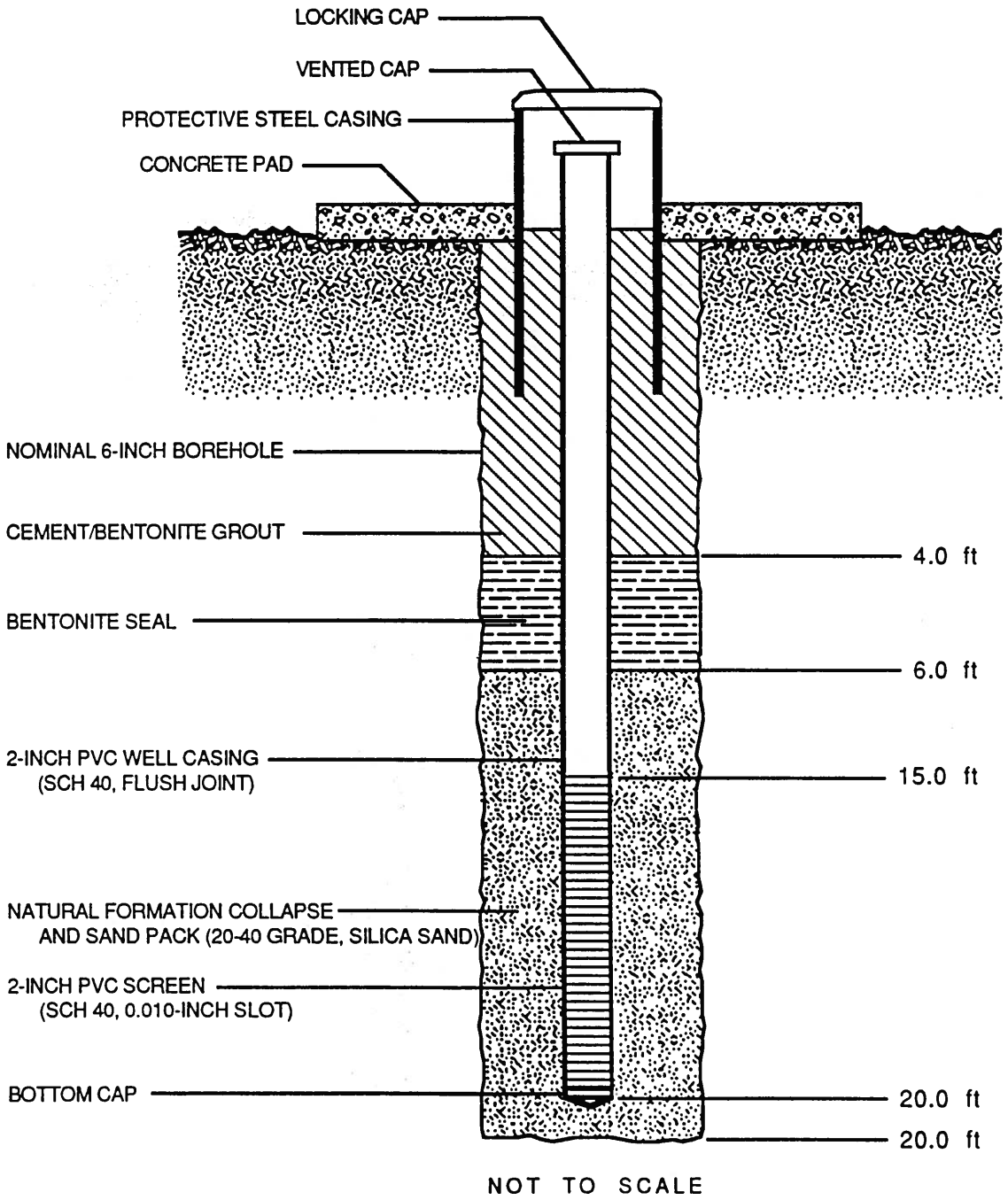
GERAGHTY & MILLER, INC.
Environmental Services

WELL-CONSTRUCTION DIAGRAM

WELL NO. **RT-3**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	184.00 ft, msl
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
S. Moyers	Envirotech	Hollow-Stem Auger	CME-75
DEVELOPMENT METHOD	**VOLUME EVACUATED**	**DATE WELL COMPLETED**	**FORMATION MONITORED**
Centrifugal Pump	125 gallons	December 19, 1991	Unconsolidated Zone



NOT TO SCALE

NOTE: All depth measurements in feet above/below ground surface.

27MAY92 Ba

FORM 408

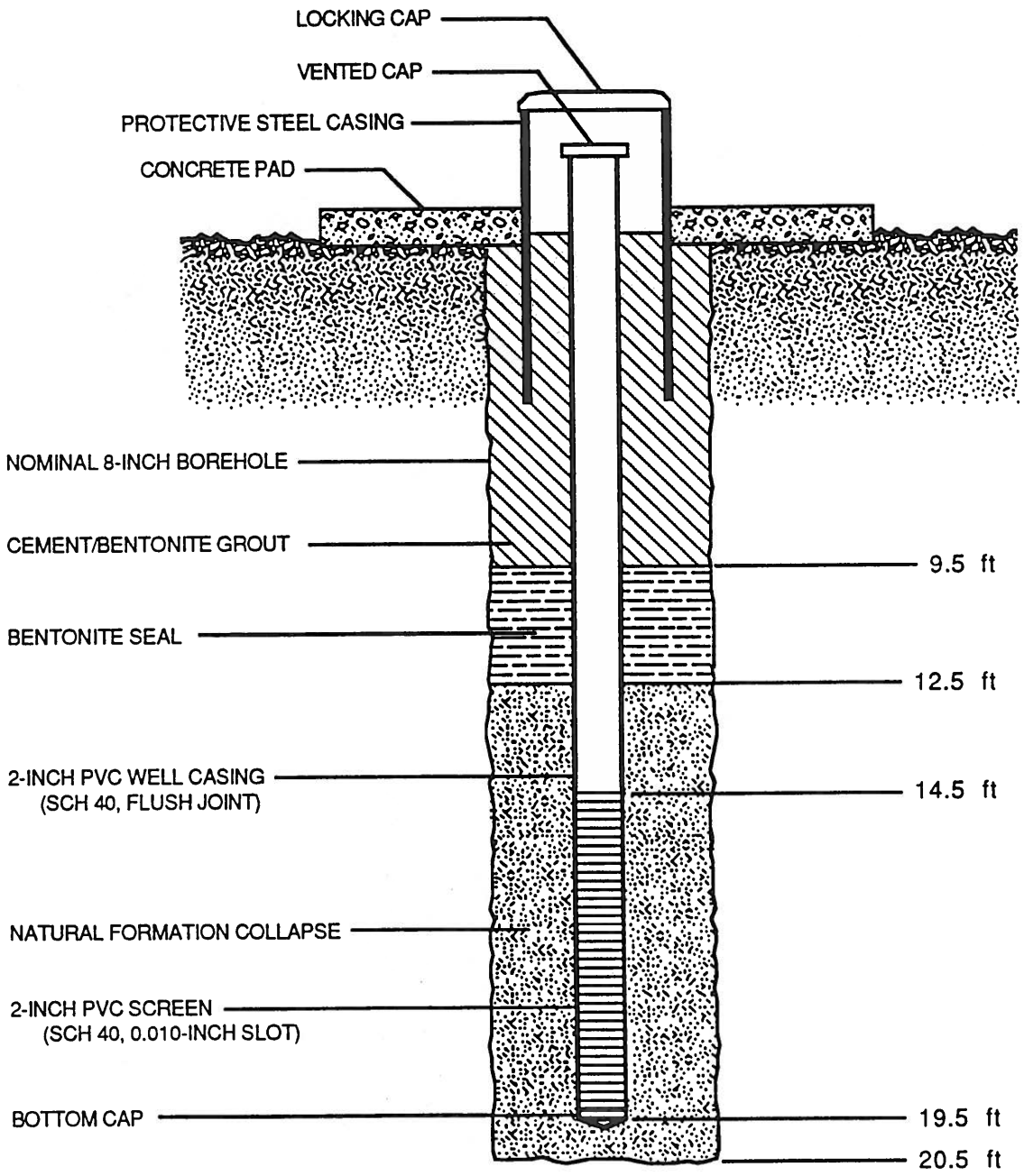
GERAGHTY & MILLER, INC.
Environmental Services

WELL-CONSTRUCTION DIAGRAM

WELL NO. **RT-4**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	184.33 ft, msl
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
S. Moyers	TTL, Inc.	Hollow-Stem Auger	CME-550
DEVELOPMENT METHOD	**VOLUME EVACUATED**	**DATE WELL COMPLETED**	**FORMATION MONITORED**
Pneumatic Pump	~70 gallons	March 18, 1992	Unconsolidated Zone



NOT TO SCALE

NOTE: All depth measurements in feet above/below ground surface.

27MAY92 Ba

FORM 408

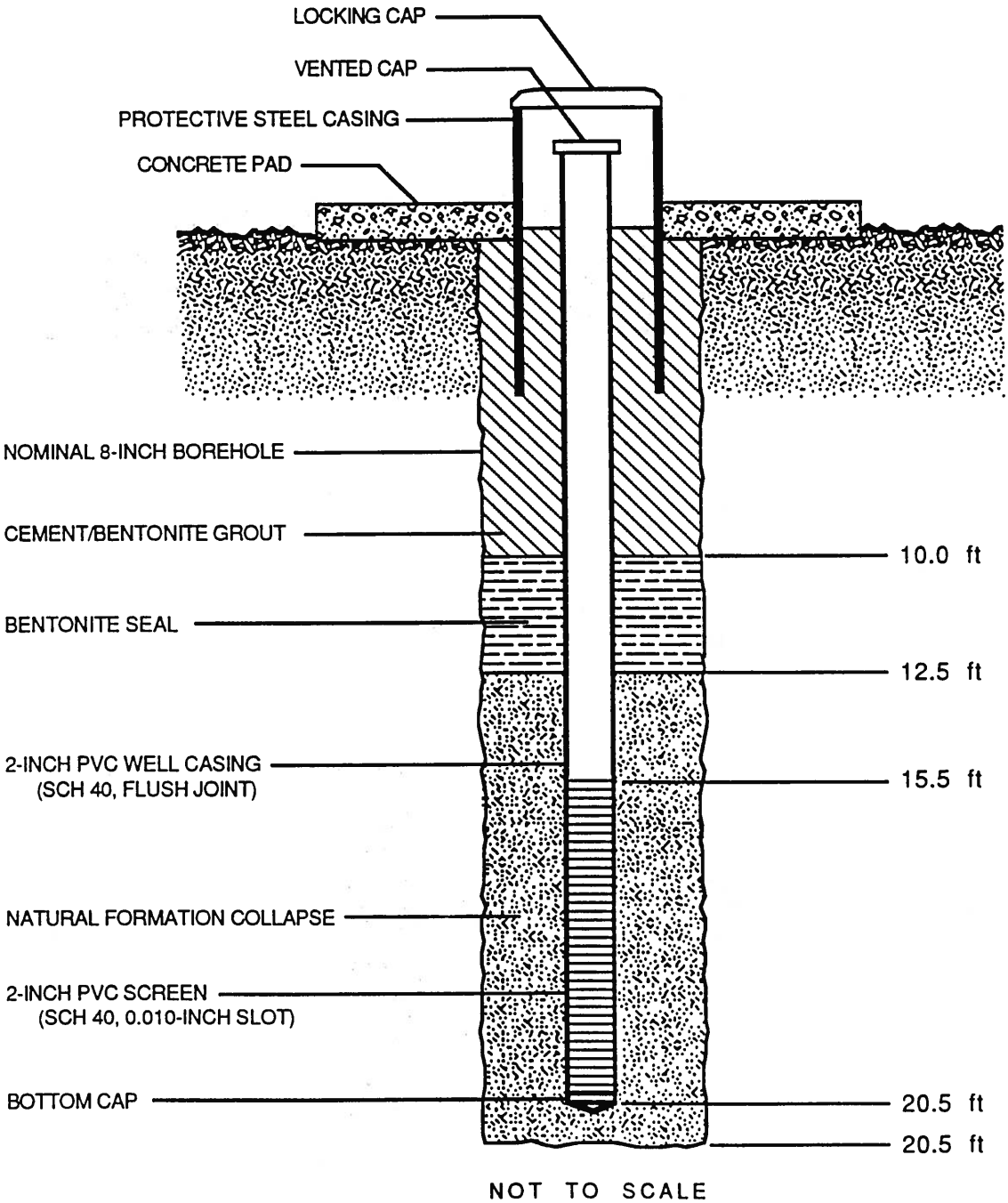
GERAGHTY & MILLER, INC.
Environmental Services

WELL-CONSTRUCTION DIAGRAM

WELL NO. **RT-5**

PROJECT Equalization Basin
RCRA Detection Monitoring

LOCATION	FACILITY	SURFACE ELEVATION	MEASURING POINT ELEVATION
Grenada, Mississippi	Randall Textron Plant	Not Surveyed	184.17 ft, msl
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
S. Moyers	TTL, Inc.	Hollow-Stem Auger	CME-550
DEVELOPMENT METHOD	**VOLUME EVACUATED**	**DATE WELL COMPLETED**	**FORMATION MONITORED**
Centrifugal Pump	115 gallons	March 18, 1992	Unconsolidated Zone



NOT TO SCALE

NOTE: All depth measurements in feet above/below ground surface.

27MAY92 Ba

FORM 408

APPENDIX C

ANALYTICAL RESULTS

APPENDIX C-1

MARCH 1992 RESULTS

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannan. GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-41295

Received: 20 MAR 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO# 06711/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-1	RT-1	03-18-92
41295-2	RT-2	03-18-92
41295-3	RT-3	03-18-92
41295-4	RT-5	03-18-92
41295-5	RT-H	03-18-92

PARAMETER	41295-1	41295-2	41295-3	41295-4	41295-5
pH (150.1)					
pH (150.1), units	6.0	6.1	6.1	6.2	7.1
Date Analyzed	03.23.92	03.23.92	03.23.92	03.23.92	03.23.92
Specific Conductance (120.1)					
Specific Conductance, uuhos/cu	590	510	800	770	210
Date Analyzed	03.23.92	03.23.92	03.23.92	03.23.92	03.23.92
Arsenic (7060)					
Arsenic, mg/l	0.012	0.044	0.12	0.045	<0.010
Date Analyzed	03.25.92	03.25.92	03.26.92	03.25.92	03.25.92
Barium (6010)					
Barium, mg/l	0.23	0.28	1.3	0.35	0.086
Date Analyzed	03.27.92	03.27.92	03.27.92	03.27.92	03.27.92
Cadmium (6010)					
Cadmium, mg/l	<0.0050	<0.0050	<0.025	<0.0050	<0.0050
Date Analyzed	03.27.92	03.27.92	03.27.92	03.27.92	03.27.92
Chromium (6010)					
Chromium, mg/l	0.098	41	77	0.058	<0.010
Date Analyzed	03.27.92	03.27.92	03.27.92	03.27.92	03.27.92
Iron (6010)					
Iron, mg/l	34	69	250	48	14
Date Analyzed	03.27.92	03.27.92	03.27.92	03.27.92	03.27.92

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

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Project: TN20001/TO# 06711/Randall Textron
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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-1	RT-1	03-18-92
41295-2	RT-2	03-18-92
41295-3	RT-3	03-18-92
41295-4	RT-5	03-18-92
41295-5	RT-H	03-18-92

PARAMETER	41295-1	41295-2	41295-3	41295-4	41295-5
Lead (7421)					
Lead, mg/l	0.022	0.067	0.15	0.019	<0.0050
Date Analyzed	03.25.92	03.25.92	03.26.92	03.25.92	03.25.92
Manganese (6010)					
Manganese, mg/l	2.0	3.2	7.2	4.3	0.15
Date Analyzed	03.27.92	03.27.92	03.27.92	03.27.92	03.27.92
Mercury (7471)					
Mercury, mg/l	<0.00020	<0.00020	0.00047	<0.00020	<0.00020
Date Analyzed	03.24.92	03.24.92	03.24.92	03.24.92	03.24.92
Selenium (7740)					
Selenium, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	03.25.92	03.25.92	03.25.92	03.25.92	03.25.92
Silver (6010)					
Silver, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	03.27.92	03.27.92	03.27.92	03.27.92	03.27.92
Sodium (6010)					
Sodium , mg/l	98	67	130	110	33
Date Analyzed	04.01.92	04.01.92	04.01.92	04.01.92	04.01.92
Chloride (325.2)					
Chloride (325.2), mg/l	110	42	90	73	15
Date Analyzed	04.01.92	04.01.92	04.01.92	04.01.92	03.30.92

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41295-1	RT-1	03-18-92
41295-2	RT-2	03-18-92
41295-3	RT-3	03-18-92
41295-4	RT-5	03-18-92
41295-5	RT-H	03-18-92

PARAMETER	41295-1	41295-2	41295-3	41295-4	41295-5
Nitrate-N					
Nitrate-N (353.2), mg/l	0.60	<0.50	<1.0	<0.050	0.090
Date Analyzed	03.20.92	03.20.92	03.20.92	03.20.92	03.20.92
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	88	83	92	110	6.2
Date Analyzed	04.02.92	04.02.92	04.02.92	04.02.92	04.02.92
Total Organic Carbon (415.1)					
Total Organic Carbon (9060) , mg/l	5.0	4.6	6.6	4.8	3.0
Date Analyzed	03.23.92	03.23.92	03.23.92	03.03.92	03.23.92
Total Organic Halogen					
Total Organic Halogen, mg/l	0.065	16	31	6.5	0.081
Date Analyzed	04.06.92	04.06.92	04.06.92	04.06.92	04.06.92

SL SAVANNAH LABORATORIES
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Revision 1
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Oak Ridge, Tennessee 37830

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-1	RT-1	03-18-92
41295-2	RT-2	03-18-92
41295-3	RT-3	03-18-92
41295-4	RT-5	03-18-92
41295-5	RT-H	03-18-92

PARAMETER	41295-1	41295-2	41295-3	41295-4	41295-5
Purgeables (624)					
Benzene, ug/l	<5.0	<2500	<2500	<250	<5.0
Bromodichloromethane, ug/l	<5.0	<2500	<2500	<250	<5.0
Bromoform, ug/l	<5.0	<2500	<2500	<250	<5.0
Bromomethane, ug/l	<10	<5000	<5000	<500	<10
Carbon Tetrachloride, ug/l	<5.0	<2500	<2500	<250	<5.0
Chlorobenzene, ug/l	<5.0	<2500	<2500	<250	<5.0
Chloroethane, ug/l	<10	<5000	<5000	<500	<10
2-Chloroethylvinyl Ether, ug/l	<10	<5000	<5000	<500	<10
Chloroform, ug/l	<5.0	<2500	<2500	<250	<5.0
Chloromethane, ug/l	<10	<5000	<5000	<500	<10
Dibromochloromethane, ug/l	<5.0	<2500	<2500	<250	<5.0
1,2-Dichlorobenzene, ug/l	<5.0	<2500	<2500	<250	<5.0
1,3-Dichlorobenzene, ug/l	<5.0	<2500	<2500	<250	<5.0
1,4-Dichlorobenzene, ug/l	<5.0	<2500	<2500	<250	<5.0
1,1-Dichloroethane, ug/l	<5.0	<2500	<2500	<250	<5.0
1,2-Dichloroethane, ug/l	<5.0	<2500	<2500	<250	<5.0
1,1-Dichloroethene, ug/l	<5.0	<2500	<2500	<250	<5.0
Trans-1,2-Dichloroethylene, ug/l	<5.0	<2500	<2500	<250	<5.0
1,2-Dichloropropane, ug/l	<5.0	<2500	<2500	<250	<5.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-1	RT-1	03-18-92
41295-2	RT-2	03-18-92
41295-3	RT-3	03-18-92
41295-4	RT-5	03-18-92
41295-5	RT-H	03-18-92

PARAMETER	41295-1	41295-2	41295-3	41295-4	41295-5
Cis-1,3-Dichloropropene, ug/l	<5.0	<2500	<2500	<250	<5.0
Trans-1,3-Dichloropropene, ug/l	<5.0	<2500	<2500	<250	<5.0
Ethylbenzene, ug/l	<5.0	<2500	<2500	<250	<5.0
Methylene Chloride, ug/l	<5.0	<2500	<2500	<250	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<2500	<2500	<250	<5.0
Tetrachloroethene, ug/l	<5.0	<2500	<2500	<250	<5.0
Toluene, ug/l	<5.0	<2500	<2500	<250	<5.0
1,1,1-Trichloroethane, ug/l	<5.0	<2500	<2500	<250	<5.0
1,1,2-Trichloroethane, ug/l	<5.0	<2500	<2500	<250	<5.0
Trichloroethene, ug/l	87	53000	77000	7000	<5.0
Trichlorofluoromethane, ug/l	<5.0	<2500	<2500	<250	<5.0
Vinyl Chloride, ug/l	<5.0	<5000	<5000	<500	<5.0
Cis-1,2-Dichloroethene, ug/l	<5.0	2600	4600	5400	<5.0
Surrogate - Toluene-d8	92 %	98 %	100 %	97 %	95 %
Surrogate - 4-Bromofluorobenzene	87 %	89 %	90 %	92 %	87 %
Surrogate - 1,2-Dichloroethane-d4	93 %	97 %	93 %	97 %	91 %
Date Analyzed	03.24.92	03.25.92	03.25.92	03.25.92	03.25.92
Fluoride					
Fluoride (340.2), mg/l	<0.20	<0.20	0.59	0.30	<0.20
Date Analyzed	04.02.92	04.02.92	04.02.92	04.02.92	04.02.92

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES. INC.

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Geraghty and Miller
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Oak Ridge, Tennessee 37830

Project: TN20001/TO# 06711/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-1	RT-1	03-18-92
41295-2	RT-2	03-18-92
41295-3	RT-3	03-18-92
41295-4	RT-5	03-18-92
41295-5	RT-H	03-18-92

PARAMETER	41295-1	41295-2	41295-3	41295-4	41295-5
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	<0.010	<0.010	0.052	0.018	<0.010
Date Analyzed	04.07.92	04.07.92	04.07.92	04.07.92	04.07.92

SL SAVANNAH LABORATORIES
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Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO# 06711/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-6	Rinsate	03-18-92
41295-7	Field Blank	03-18-92

PARAMETER	41295-6	41295-7
pH (150.1)		
pH (150.1), units	6.0	5.9
Date Analyzed	03.23.92	03.23.92
Specific Conductance (120.1)		
Specific Conductance, umhos/cm	<1.0	<1.0
Date Analyzed	03.23.92	03.23.92
Arsenic (7060)		
Arsenic, mg/l	<0.010	<0.010
Date Analyzed	03.25.92	03.25.92
Barium (6010)		
Barium, mg/l	<0.010	<0.010
Date Analyzed	03.27.92	03.27.92
Cadmium (6010)		
Cadmium, ug/l	<0.0050	<0.0050
Date Analyzed	03.27.92	03.27.92
Chromium (6010)		
Chromium, mg/l	<0.010	<0.010
Date Analyzed	03.27.92	03.27.92
Iron (6010)		
Iron, mg/l	<0.050	<0.050
Date Analyzed	03.27.92	03.27.92
Lead (7421)		
Lead, mg/l	<0.0050	<0.0050
Date Analyzed	03.25.92	03.25.92

SL SAVANNAH LABORATORIES
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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-6	Rinsate	03-18-92
41295-7	Field Blank	03-18-92

PARAMETER	41295-6	41295-7
Manganese (6010)		
Manganese, mg/l	<0.010	<0.010
Date Analyzed	03.27.92	03.27.92
Mercury (7471)		
Mercury, mg/l	<0.00020	<0.00020
Date Analyzed	03.24.92	03.24.92
Selenium (7740)		
Selenium, mg/l	<0.010	<0.010
Date Analyzed	03.25.92	03.25.92
Silver (6010)		
Silver, mg/l	<0.010	<0.010
Date Analyzed	03.27.92	03.27.92
Sodium (6010)		
Sodium , mg/l	<0.50	<0.50
Date Analyzed	04.01.92	04.01.92
Chloride (325.2)		
Chloride (325.2), mg/l	<1.0	<1.0
Date Analyzed	03.30.92	03.30.92
Nitrate-N		
Nitrate-N (353.2), mg/l	<0.050	<0.050
Date Analyzed	03.20.92	03.20.92
Sulfate as SO4 (9035)		
Sulfate as SO4 (375.2), mg/l	<5.0	<5.0
Date Analyzed	04.02.92	04.02.92

SL SAVANNAH LABORATORIES
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Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO# 06711/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-6	Rinsate	03-18-92
41295-7	Field Blank	03-18-92

PARAMETER	41295-6	41295-7
Total Organic Carbon (415.1)		
Total Organic Carbon (9060) , mg/l	2.4	4.1
Date Analyzed	03.23.92	03.23.92
Total Organic Halogen		
Total Organic Halogen, mg/l	0.021	<0.010
Date Analyzed	04.06.92	04.06.92

SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

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Revision 1
Received: 20 MAR 92

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Geraghty and Miller
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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-6	Rinsate	03-18-92
41295-7	Field Blank	03-18-92

PARAMETER	41295-6	41295-7
Purgeables (624)		
Benzene, ug/l	<5.0	<5.0
Bromodichloromethane, ug/l	<5.0	<5.0
Bromoform, ug/l	<5.0	<5.0
Bromomethane, ug/l	<10	<10
Carbon Tetrachloride, ug/l	<5.0	<5.0
Chlorobenzene, ug/l	<5.0	<5.0
Chloroethane, ug/l	<10	<10
2-Chloroethylvinyl Ether, ug/l	<10	<10
Chloroform, ug/l	<5.0	<5.0
Chloromethane, ug/l	<10	<10
Dibromochloromethane, ug/l	<5.0	<5.0
1,2-Dichlorobenzene, ug/l	<5.0	<5.0
1,3-Dichlorobenzene, ug/l	<5.0	<5.0
1,4-Dichlorobenzene, ug/l	<5.0	<5.0
1,1-Dichloroethane, ug/l	<5.0	<5.0
1,2-Dichloroethane, ug/l	<5.0	<5.0
1,1-Dichloroethene, ug/l	<5.0	<5.0
Trans-1,2-Dichloroethylene, ug/l	<5.0	<5.0
1,2-Dichloropropane, ug/l	<5.0	<5.0
Cis-1,3-Dichloropropene, ug/l	<5.0	<5.0
Trans-1,3-Dichloropropene, ug/l	<5.0	<5.0
Ethylbenzene, ug/l	<5.0	<5.0

SL SAVANNAH LABORATORIES
& ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannan, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-41295
Revision 1
Received: 20 MAR 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO# 06711/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-6	Rinsate	03-18-92
41295-7	Field Blank	03-18-92

PARAMETER	41295-6	41295-7
Methylene Chloride, ug/l	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<5.0
Tetrachloroethene, ug/l	<5.0	<5.0
Toluene, ug/l	<5.0	<5.0
1,1,1-Trichloroethane, ug/l	<5.0	<5.0
1,1,2-Trichloroethane, ug/l	<5.0	<5.0
Trichloroethene, ug/l	<5.0	<5.0
Trichlorofluoromethane, ug/l	<5.0	<5.0
Vinyl Chloride, ug/l	<5.0	<5.0
Cis-1,2-Dichloroethene, ug/l	<5.0	<5.0
Surrogate - Toluene-d8	93 %	93 %
Surrogate - 4-Bromofluorobenzene	87 %	88 %
Surrogate - 1,2-Dichloroethane-d4	91 %	92 %
Date Analyzed	03.25.92	03.25.92
Fluoride		
Fluoride (340.2), mg/l	<0.20	<0.20
Date Analyzed	04.02.92	04.02.92
Phenolics, Total Recoverable (9065)		
Phenolics,Total Recoverable, mg/l	<0.010	<0.010
Date Analyzed	04.07.92	04.07.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-8	RT-4	03-19-92
41295-9	Trip Blank	03-18-92

PARAMETER	41295-8	41295-9
Purgeables (624)		
Benzene, ug/l	<50	<5.0
Bromodichloromethane, ug/l	<50	<5.0
Bromoform, ug/l	<50	<5.0
Bromomethane, ug/l	<100	<10
Carbon Tetrachloride, ug/l	<50	<5.0
Chlorobenzene, ug/l	<50	<5.0
Chloroethane, ug/l	<100	<10
2-Chloroethylvinyl Ether, ug/l	<100	<10
Chloroform, ug/l	<50	<5.0
Chloromethane, ug/l	<100	<10
Dibromochloromethane, ug/l	<50	<5.0
1,2-Dichlorobenzene, ug/l	<50	<5.0
1,3-Dichlorobenzene, ug/l	<50	<5.0
1,4-Dichlorobenzene, ug/l	<50	<5.0
1,1-Dichloroethane, ug/l	<50	<5.0
1,2-Dichloroethane, ug/l	<50	<5.0
1,1-Dichloroethene, ug/l	<50	<5.0
Trans-1,2-Dichloroethylene, ug/l	<50	<5.0
1,2-Dichloropropane, ug/l	<50	<5.0
Cis-1,3-Dichloropropene, ug/l	<50	<5.0
Trans-1,3-Dichloropropene, ug/l	<50	<5.0
Ethylbenzene, ug/l	<50	<5.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41295-8	RT-4	03-19-92
41295-9	Trip Blank	03-18-92

PARAMETER	41295-8	41295-9
Methylene Chloride, ug/l	<50	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<50	<5.0
Tetrachloroethene, ug/l	<50	<5.0
Toluene, ug/l	<50	<5.0
1,1,1-Trichloroethane, ug/l	<50	<5.0
1,1,2-Trichloroethane, ug/l	<50	<5.0
Trichloroethene, ug/l	290	<5.0
Trichlorofluoromethane, ug/l	<50	<5.0
Vinyl Chloride, ug/l	<100	<10
Cis-1,2-Dichloroethene, ug/l	<50	<5.0
Surrogate - Toluene-d8	94 %	95 %
Surrogate - 4-Bromofluorobenzene	88 %	86 %
Surrogate - 1,2-Dichloroethane-d4	94 %	92 %
Date Analyzed	03.25.92	03.24.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-10	Detection Limits - Liquid
41295-11	Method Blank Result
41295-12	Lab Control Standard (LCS) Result
41295-13	LCS Expected Value
41295-14	LCS % Recovery

PARAMETER	41295-10	41295-11	41295-12	41295-13	41295-14
Specific Conductance (120.1)					
Specific Conductance, uuhos/cu	1.0	<1.0	1383	1380	100 %
Date Analyzed	---	03.23.92	03.23.92	---	---
Arsenic (7060)					
Arsenic, mg/l	0.010	<0.010	0.052	0.050	104 %
Date Analyzed	---	03.25.92	03.25.92	---	---
Barium (6010)					
Barium, mg/l	0.010	<0.010	0.90	1.0	90 %
Date Analyzed	---	03.27.92	03.27.92	---	---
Cadmium (6010)					
Cadmium, mg/l	0.0050	<0.0050	0.90	1.0	90 %
Date Analyzed	---	03.27.92	03.27.92	---	---
Chromium (6010)					
Chromium, mg/l	0.010	<0.010	0.95	1.0	95 %
Date Analyzed	---	03.27.92	03.27.92	---	---
Lead (7421)					
Lead, mg/l	0.0050	<0.0050	0.050	0.050	100 %
Date Analyzed	---	03.25.92	03.25.92	---	---
Iron (6010)					
Iron, mg/l	0.050	<0.050	1.03	1.0	103 %
Date Analyzed	---	03.27.92	03.27.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-10	Detection Limits - Liquid
41295-11	Method Blank Result
41295-12	Lab Control Standard (LCS) Result
41295-13	LCS Expected Value
41295-14	LCS % Recovery

PARAMETER	41295-10	41295-11	41295-12	41295-13	41295-14
Manganese (6010)					
Manganese, mg/l	0.010	<0.010	0.92	1.0	92 %
Date Analyzed	---	03.27.92	03.27.92	---	---
Mercury (7471)					
Mercury, mg/l	0.00020	<0.00020	0.00287	0.00300	96 %
Date Analyzed	---	03.24.92	03.24.92	---	---
Selenium (7740)					
Selenium, mg/l	0.010	<0.010	0.047	0.050	94 %
Date Analyzed	---	03.25.92	03.25.92	---	---
Silver (6010)					
Silver, mg/l	0.010	<0.010	0.89	1.01	88 %
Date Analyzed	---	03.27.92	03.27.92	---	---
Sodium (6010)					
Sodium , mg/l	0.50	<0.50	0.93	1.0	93 %
Date Analyzed	---	04.01.92	04.01.92	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	1.0	<1.0	7.90	7.7	103 %
Date Analyzed	---	03.30.92	03.30.92	---	---
Fluoride					
Fluoride (340.2), mg/l	0.20	<0.20	2.12	2.16	98 %
Date Analyzed	---	04.02.92	04.02.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-10	Detection Limits - Liquid
41295-11	Method Blank Result
41295-12	Lab Control Standard (LCS) Result
41295-13	LCS Expected Value
41295-14	LCS % Recovery

PARAMETER	41295-10	41295-11	41295-12	41295-13	41295-14
Nitrate-N					
Nitrate-N (353.2), mg/l	0.050	<0.050	0.398	0.383	104 %
Date Analyzed	---	03.20.92	03.20.92	---	---
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	5.0	<5.0	26.1	27.6	95 %
Date Analyzed	---	04.02.92	04.02.92	---	---
Total Organic Carbon (415.1)					
Total Organic Carbon (9060) , mg/l	1.0	<1.0	28.2	23.0	123 %
Date Analyzed	---	03.23.92	03.23.92	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	0.010	<0.010	0.11	0.10	110 %
Date Analyzed	---	04.06.92	04.06.92	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	0.010	<0.010	0.220	0.235	94 %
Date Analyzed	---	04.07.92	04.07.92	---	---

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REPORT OF RESULTS

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41295-10	Detection Limits - Liquid
41295-11	Method Blank Result
41295-12	Lab Control Standard (LCS) Result
41295-13	LCS Expected Value
41295-14	LCS % Recovery

PARAMETER	41295-10	41295-11	41295-12	41295-13	41295-14
Purgeables (624)					
Benzene, ug/l	5.0	<5.0	44.8	50	90 %
Bromodichloromethane, ug/l	5.0	<5.0	---	---	---
Bromoform, ug/l	5.0	<5.0	---	---	---
Bromomethane, ug/l	10	<10	---	---	---
Carbon Tetrachloride, ug/l	5.0	<5.0	---	---	---
Chlorobenzene, ug/l	5.0	<5.0	47.7	50	95 %
Chloroethane, ug/l	10	<10	---	---	---
2-Chloroethylvinyl Ether, ug/l	10	<10	---	---	---
Chloroform, ug/l	5.0	<5.0	---	---	---
Chloromethane, ug/l	10	<10	---	---	---
Dibromochloromethane, ug/l	5.0	<5.0	---	---	---
1,2-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,3-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,4-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,1-Dichloroethane, ug/l	5.0	<5.0	---	---	---
1,2-Dichloroethane, ug/l	5.0	<5.0	---	---	---
1,1-Dichloroethene, ug/l	5.0	<5.0	44.1	50	88 %
Trans-1,2-Dichloroethylene, ug/l	5.0	<5.0	---	---	---
1,2-Dichloropropane, ug/l	5.0	<5.0	---	---	---

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-10	Detection Limits - Liquid
41295-11	Method Blank Result
41295-12	Lab Control Standard (LCS) Result
41295-13	LCS Expected Value
41295-14	LCS % Recovery

PARAMETER	41295-10	41295-11	41295-12	41295-13	41295-14
Cis-1,3-Dichloropropene, ug/l	5.0	<5.0	---	---	---
Trans-1,3-Dichloropropene, ug/l	5.0	<5.0	---	---	---
Ethylbenzene, ug/l	5.0	<5.0	---	---	---
Methylene Chloride, ug/l	5.0	<5.0	---	---	---
1,1,2,2-Tetrachloroethane, ug/l	5.0	<5.0	---	---	---
Tetrachloroethene, ug/l	5.0	<5.0	---	---	---
Toluene, ug/l	5.0	<5.0	50.5	50	101 %
1,1,1-Trichloroethane, ug/l	5.0	<5.0	---	---	---
1,1,2-Trichloroethane, ug/l	5.0	<5.0	---	---	---
Trichloroethene, ug/l	5.0	<5.0	41.9	50	84 %
Trichlorofluoromethane, ug/l	5.0	<5.0	---	---	---
Vinyl Chloride, ug/l	5.0	<5.0	---	---	---
Cis-1,2-Dichloroethene, ug/l	5.0	<5.0	---	---	---
Surrogate - Toluene-d8	---	94 %	94 %	---	---
Surrogate - 4-Bromofluorobenzene	---	90 %	88 %	---	---
Surrogate - 1,2-Dichloroethane-d4	---	90 %	90 %	---	---
Date Analyzed	---	03.24.92	03.24.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-15	LCS % Recovery Limits
41295-16	Matrix Spike (MS) RT-1 Result/Duplicate
41295-17	MS Expected Value
41295-18	MS % Recovery/Duplicate
41295-19	MS % Recovery Limit

PARAMETER	41295-15	41295-16	41295-17	41295-18	41295-19
Specific Conductance (120.1)					
Specific Conductance, uuhos/cu	90-110 %	---	---	---	---
Date Analyzed	---	---	---	---	---
Arsenic (7060)					
Arsenic, mg/l	80-120 %	.049/.050	0.050	98/100 %	75-125 %
Date Analyzed	---	03.26.92	---	---	---
Barium (6010)					
Barium, mg/l	80-120 %	1.04/1.03	1.0	104/103 %	75-125 %
Date Analyzed	---	03.27.92	---	---	---
Cadmium (6010)					
Cadmium, mg/l	80-120 %	0.88/0.89	1.0	88/89 %	75-125 %
Date Analyzed	---	03.27.92	---	---	---
Chromium (6010)					
Chromium, mg/l	80-120 %	0.97/0.98	1.0	97/98 %	75-125 %
Date Analyzed	---	03.27.92	---	---	---
Lead (7421)					
Lead, mg/l	75-125 %	.051/.052	0.050	102/104 %	75-125 %
Date Analyzed	---	03.26.92	---	---	---
Iron (6010)					
Iron, mg/l	80-120 %	*F61	---	---	---
Date Analyzed	---	03.27.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-15	LCS % Recovery Limits
41295-16	Matrix Spike (MS) RT-1 Result/Duplicate
41295-17	MS Expected Value
41295-18	MS % Recovery/Duplicate
41295-19	MS % Recovery Limit

PARAMETER	41295-15	41295-16	41295-17	41295-18	41295-19
Manganese (6010)					
Manganese, mg/l	80-120 %	1.08/1.01	1.0	108/101 %	75-125 %
Date Analyzed	---	03.27.92	---	---	---
Mercury (7471)					
Mercury, mg/l	80-120 %	0.00121/*	0.00100	121/120 %	75-125 %
Date Analyzed	---	03.25.92	---	---	---
Selenium (7740)					
Selenium, mg/l	80-120 %	.042/.043	0.050	84/86 %	75-125 %
Date Analyzed	---	03.26.92	---	---	---
Silver (6010)					
Silver, mg/l	80-120 %	0.86/0.86	1.01	86/86 %	75-125 %
Date Analyzed	---	03.27.92	---	---	---
Sodium (6010)					
Sodium , mg/l	80-120 %	*F61	---	---	---
Date Analyzed	---	04.01.92	---	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	85-115 %	3.91/4.19	5.0	78/84 %	85-115 %
Date Analyzed	---	04.01.92	---	---	---
Fluoride					
Fluoride (340.2), mg/l	75-115 %	0.99/1.03	1.00	99/103 %	75-125 %
Date Analyzed	---	04.02.92	---	---	---

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-15	LCS % Recovery Limits
41295-16	Matrix Spike (MS) RT-1 Result/Duplicate
41295-17	MS Expected Value
41295-18	MS % Recovery/Duplicate
41295-19	MS % Recovery Limit

PARAMETER	41295-15	41295-16	41295-17	41295-18	41295-19
Nitrate-N					
Nitrate-N (353.2), mg/l	85-115 %	.203/.206	0.20	102/103 %	75-125 %
Date Analyzed	---	03.20.92	---	---	---
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	80-120 %	19.3/22.0	20	97/110 %	75-125 %
Date Analyzed	---	04.02.92	---	---	---
Total Organic Carbon (415.1)					
Total Organic Carbon (9060) , mg/l	60-140 %	115/115	100	115/115 %	60-140 %
Date Analyzed	---	03.23.92	---	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	60-140 %	.096/.096	0.10	96/96 %	60-140 %
Date Analyzed	---	04.06.92	---	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	75-125 %	.200/.200	0.200	100/100 %	75-125 %
Date Analyzed	---	04.07.92	---	---	---

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41295-16	Matrix Spike (MS) RT-1 Result/Duplicate
41295-17	MS Expected Value
41295-18	MS % Recovery/Duplicate
41295-19	MS % Recovery Limit

PARAMETER	41295-15	41295-16	41295-17	41295-18	41295-19
Purgeables (624)					
Benzene, ug/l	76-127 %	42.4/42.3	50	85/85 %	76-127 %
Chlorobenzene, ug/l	75-130 %	48.6/49.6	50	97/99 %	75-130 %
1,1-Dichloroethene, ug/l	61-145 %	48.0/49.5	50	96/99 %	61-145 %
Toluene, ug/l	76-125 %	50.0/51.2	50	100/102 %	76-125 %
Trichloroethene, ug/l	71-120 %	42.5/38.9	50	85/78 %	71-120 %
Surrogate - Toluene-d8	---	99/102 %	---	---	---
Surrogate - 4-Bromofluorobenzene	---	93/95 %	---	---	---
Surrogate - 1,2-Dichloroethane-d4	---	97/98 %	---	---	---
Date Analyzed	---	03.25.92	---	---	---

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

41295-20 MS % RPD (Limit)

PARAMETER	41295-20
Specific Conductance (120.1)	
Specific Conductance	---
Date Analyzed	---
Arsenic (7060)	
Arsenic	2.0(<20) %
Barium (6010)	
Barium	0.97(<20)%
Cadmium (6010)	
Cadmium	1.1(<20) %
Chromium (6010)	
Chromium	1.0(<20) %
Lead (7421)	
Lead	1.9(<20) %
Iron (6010)	
Iron	---
Manganese (6010)	
Manganese	6.7(<20) %
Mercury (7471)	
Mercury	0.83(<20)%
Selenium (7740)	
Selenium	2.4(<20) %
Silver (6010)	
Silver	0(<20) %
Sodium (6010)	
Sodium	---

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LOG NO: S2-41295

Received: 20 MAR 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO# 06711/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-20	MS % RPD (Limit)

PARAMETER	41295-20
Chloride (325.2)	
Chloride (325.2)	7.4(<30) %
Fluoride	
Fluoride (340.2)	4.0(<30) %
Nitrate-N	
Nitrate-N (353.2)	0.98(<30)%
Sulfate as SO4 (9035)	
Sulfate as SO4 (375.2)	13(<30) %
Total Organic Carbon (415.1)	
Total Organic Carbon (9060)	0(<40) %
Total Organic Halogen	
Total Organic Halogen	0(<40) %
Phenolics, Total Recoverable (9065)	
Phenolics,Total Recoverable	0(<30) %
Purgeables (624)	
Benzene	0(<22) %
Chlorobenzene	2.0(<17) %
1,1-Dichloroethene	3.1(<19) %
Toluene	2.0(<17) %
Trichloroethene	8.6(<20) %

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-21	ICVS/CCVS Control Limits
41295-22	ICVS/CCVS Source Lot
41295-23	ICVS/CCVS Expected Value
41295-24	ICVS Result
41295-25	ICVS % Recovery

PARAMETER	41295-21	41295-22	41295-23	41295-24	41295-25
Arsenic (7060)					
Arsenic, mg/l	90-110 %	3-159AS	0.050	0.047	94 %
Date Analyzed	---	---	---	03.25.92	---
Barium (6010)					
Barium, mg/l	90-110 %	3-128AS	1.0	1.01	101 %
Date Analyzed	---	---	---	03.27.92	---
Cadmium (6010)					
Cadmium, mg/l	90-110 %	3-159AS	1.0	1.0	100 %
Date Analyzed	---	---	---	03.27.92	---
Chromium (6010)					
Chromium, mg/l	90-110 %	3-159AS	1.0	1.04	104 %
Date Analyzed	---	---	---	03.27.92	---
Iron (6010)					
Iron, mg/l	90-110 %	3-159AS	1.0	1.10	110 %
Date Analyzed	---	---	---	03.27.92	---
Lead (7421)					
Lead, mg/l	90-110 %	SPEX	0.050	0.050	100 %
Date Analyzed	---	---	---	03.26.92	---
Manganese (6010)					
Manganese, mg/l	90-110 %	3-159AS	1.0	0.98	98 %
Date Analyzed	---	---	---	03.27.92	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-21	ICVS/CCVS Control Limits
41295-22	ICVS/CCVS Source Lot
41295-23	ICVS/CCVS Expected Value
41295-24	ICVS Result
41295-25	ICVS % Recovery

PARAMETER	41295-21	41295-22	41295-23	41295-24	41295-25
Mercury (7471)					
Mercury, mg/l	80-120 %	EPA475-1	0.00300	0.00297	99 %
Date Analyzed	---	---	---	03.25.92	---
Selenium (7740)					
Selenium, mg/l	90-110 %	3-159AS	0.050	0.048	96 %
Date Analyzed	---	---	---	03.25.92	---
Silver (6010)					
Silver, mg/l	90-110 %	3-128AS	1.01	1.01	100 %
Date Analyzed	---	---	---	03.27.92	---
Sodium (6010)					
Sodium , mg/l	90-110 %	3-159AS	1.0	1.08	108 %
Date Analyzed	---	---	---	04.01.92	---

Methods: EPA 40 CFR Part 136 & SW-846 3rd Edition.
MS Duplicate result for Mercury = 0.00120 mg/l
*F61 = Matrix spikes were not recovered due to the abundance of a target analyte in the sample.

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-26	CCVS Result
41295-27	CCVS % Recovery

PARAMETER	41295-26	41295-27
Arsenic (7060)		
Arsenic, mg/l	0.050	100 %
Date Analyzed	03.25.92	---
Barium (6010)		
Barium, mg/l	0.99	99 %
Date Analyzed	03.27.92	---
Cadmium (6010)		
Cadmium, mg/l	0.99	99 %
Date Analyzed	03.27.92	---
Chromium (6010)		
Chromium, mg/l	1.01	101 %
Date Analyzed	03.27.92	---
Iron (6010)		
Iron, mg/l	1.07	107 %
Date Analyzed	03.27.92	---
Lead (7421)		
Lead, mg/l	0.051	102 %
Date Analyzed	03.26.92	---
Manganese (6010)		
Manganese, mg/l	0.98	98 %
Date Analyzed	03.27.92	---
Mercury (7471)		
Mercury, mg/l	0.00309	103 %
Date Analyzed	03.25.92	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41295-26	CCVS Result
41295-27	CCVS % Recovery

PARAMETER	41295-26	41295-27
Selenium (7740)		
Selenium, mg/l	0.052	104 %
Date Analyzed	03.25.92	---
Silver (6010)		
Silver, mg/l	1.00	99 %
Date Analyzed	03.27.92	---
Sodium (6010)		
Sodium , mg/l	1.08	108 %
Date Analyzed	04.01.92	---

Methods: EPA 40 CFR Part 136 & SW-846 3rd Edition.
MS Duplicate result for Mercury = 0.00120 mg/l
*F61 = Matrix spikes were not recovered due to the abundance of a target analyte in the sample.

Janette D. Long

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LOG NO: S2-41321

Received: 21 MAR 92

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Project: TN20001/TO#06711/RANDALL TEXTRON
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41321-1	RT-4	03-20-92

PARAMETER	41321-1
pH (150.1)	
pH (150.1), units	6.6
Date Analyzed	03.23.92
Specific Conductance (120.1)	
Specific Conductance, umhos/cm	460
Date Analyzed	03.23.92
Arsenic (7060)	
Arsenic, mg/l	0.023
Date Analyzed	04.01.92
Barium (6010)	
Barium, mg/l	0.38
Date Analyzed	03.30.92
Cadmium (6010)	
Cadmium, mg/l	<0.0050
Date Analyzed	03.30.92
Chromium (6010)	
Chromium, mg/l	0.065
Date Analyzed	03.30.92
Iron (6010)	
Iron, mg/l	59
Date Analyzed	03.30.92
Lead (7421)	
Lead, mg/l	0.032
Date Analyzed	03.31.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41321-1	RT-4	03-20-92

PARAMETER	41321-1
Manganese (6010)	
Manganese, mg/l	1.5
Date Analyzed	03.30.92
Mercury (7471)	
Mercury, mg/l	<0.00020
Date Analyzed	04.01.92
Selenium (7740)	
Selenium, mg/l	<0.050
Date Analyzed	04.07.92
Silver (6010)	
Silver, mg/l	<0.010
Date Analyzed	04.02.92
Sodium (6010)	
Sodium , mg/l	80
Date Analyzed	03.30.92
Chloride (325.2)	
Chloride (325.2), mg/l	51
Date Analyzed	04.01.92
Fluoride	
Fluoride (340.2), mg/l	<0.20
Date Analyzed	04.02.92
Nitrate-N	
Nitrate-N (353.2), mg/l	<0.050
Date Analyzed	03.23.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
41321-1	RT-4	03-20-92

PARAMETER	41321-1
Sulfate as SO4 (9035)	
Sulfate as SO4 (375.2), mg/l	65
Date Analyzed	04.02.92
Total Organic Carbon (415.1)	
Total Organic Carbon (9060) , mg/l	7.0
Date Analyzed	03.23.92
Total Organic Halogen	
Total Organic Halogen, mg/l	1.1
Date Analyzed	04.06.92
Phenolics, Total Recoverable (9065)	
Phenolics,Total Recoverable, mg/l	<0.010
Date Analyzed	04.07.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-2	Detection Limits - Liquid
41321-3	Method Blank Result
41321-4	Lab Control Standard (LCS) Result
41321-5	LCS Expected Value
41321-6	LCS % Recovery

PARAMETER	41321-2	41321-3	41321-4	41321-5	41321-6
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	1.0	<1.0	1388	1408	99 %
Date Analyzed	---	03.23.92	03.23.92	---	---
Arsenic (7060)					
Arsenic, mg/l	0.010	<0.010	0.052	0.050	104 %
Date Analyzed	---	04.01.92	04.01.92	---	---
Barium (6010)					
Barium, mg/l	0.010	<0.010	0.98	1.0	98 %
Date Analyzed	---	03.30.92	03.30.92	---	---
Cadmium (6010)					
Cadmium, mg/l	0.0050	<0.0050	0.94	1.0	94 %
Date Analyzed	---	03.30.92	03.30.92	---	---
Chromium (6010)					
Chromium, mg/l	0.010	<0.010	0.98	1.0	98 %
Date Analyzed	---	03.30.92	03.30.92	---	---
Iron (6010)					
Iron, mg/l	0.050	<0.050	0.97	1.0	97 %
Date Analyzed	---	03.30.92	03.30.92	---	---
Lead (7421)					
Lead, mg/l	0.0050	<0.0050	0.050	0.050	100 %
Date Analyzed	---	03.31.92	03.31.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-2	Detection Limits - Liquid
41321-3	Method Blank Result
41321-4	Lab Control Standard (LCS) Result
41321-5	LCS Expected Value
41321-6	LCS % Recovery

PARAMETER	41321-2	41321-3	41321-4	41321-5	41321-6
Manganese (6010)					
Manganese, mg/l	0.010	<0.010	0.96	1.0	96 %
Date Analyzed	---	03.30.92	03.30.92	---	---
Mercury (7471)					
Mercury, mg/l	0.00020	<0.00020	0.0031	0.0030	103 %
Date Analyzed	---	04.01.92	04.01.92	---	---
Selenium (7740)					
Selenium, mg/l	0.010	<0.010	0.049	0.050	98 %
Date Analyzed	---	04.07.92	04.07.92	---	---
Silver (6010)					
Silver, mg/l	0.010	<0.010	0.81	1.01	80 %
Date Analyzed	---	04.02.92	04.02.92	---	---
Sodium (6010)					
Sodium , mg/l	0.50	<0.50	1.04	1.0	104 %
Date Analyzed	---	03.30.92	03.30.92	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	1.0	<1.0	7.72	7.7	100 %
Date Analyzed	---	04.01.92	04.01.92	---	---
Fluoride					
Fluoride (340.2), mg/l	0.20	<0.20	2.04	2.16	94 %
Date Analyzed	---	04.02.92	04.02.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-2	Detection Limits - Liquid
41321-3	Method Blank Result
41321-4	Lab Control Standard (LCS) Result
41321-5	LCS Expected Value
41321-6	LCS % Recovery

PARAMETER	41321-2	41321-3	41321-4	41321-5	41321-6
Nitrate-N					
Nitrate-N (353.2), mg/l	0.050	<0.050	0.398	0.383	104 %
Date Analyzed	---	03.23.92	03.23.92	---	---
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	5.0	<5.0	24.0	27.6	87 %
Date Analyzed	---	04.02.92	04.02.92	---	---
Total Organic Carbon (415.1)					
Total Organic Carbon (9060) , mg/l	1.0	<1.0	26.6	23.0	116 %
Date Analyzed	---	03.23.92	03.23.92	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	0.010	<0.010	0.11	0.10	110 %
Date Analyzed	---	04.06.92	04.06.92	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	0.010	<0.010	0.223	0.235	95 %
Date Analyzed	---	04.07.92	04.07.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-7	LCS % Recovery Limits
41321-8	Matrix Spike (MS) Result/Duplicate
41321-9	MS Expected Value
41321-10	MS % Recovery/Duplicate
41321-11	MS % Recovery Limit

PARAMETER	41321-7	41321-8	41321-9	41321-10	41321-11
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	90-110 %	---	---	---	---
Date Analyzed	---	---	---	---	---
Arsenic (7060)					
Arsenic, mg/l	80-120 %	.052/.052	0.050	104/104 %	75-125 %
Date Analyzed	---	04.01.92	---	---	---
Barium (6010)					
Barium, mg/l	80-120 %	0.80/0.86	1.0	80/86 %	80-120 %
Date Analyzed	---	03.30.92	---	---	---
Cadmium (6010)					
Cadmium, mg/l	80-120 %	0.87/0.93	1.0	87/93 %	75-125 %
Date Analyzed	---	03.30.92	---	---	---
Chromium (6010)					
Chromium, mg/l	80-120 %	0.94/1.0	1.0	94/100 %	75-125 %
Date Analyzed	---	03.30.92	---	---	---
Iron (6010)					
Iron, mg/l	80-120 %	*F61	---	---	---
Date Analyzed	---	03.30.92	---	---	---
Lead (7421)					
Lead, mg/l	80-120 %	.048/.052	0.050	96/104 %	75-125 %
Date Analyzed	---	03.31.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-7	LCS % Recovery Limits
41321-8	Matrix Spike (MS) Result/Duplicate
41321-9	MS Expected Value
41321-10	MS % Recovery/Duplicate
41321-11	MS % Recovery Limit

PARAMETER	41321-7	41321-8	41321-9	41321-10	41321-11
Manganese (6010)					
Manganese, mg/l	80-120 %	0.95/1.08	1.0	95/108 %	75-125 %
Date Analyzed	---	03.30.92	---	---	---
Mercury (7471)					
Mercury, mg/l	80-120 %	0.0016/*	0.0010	160/110 %	75-125 %
Date Analyzed	---	04.01.92	---	---	---
Selenium (7740)					
Selenium, mg/l	80-120 %	*F62	0.050	---	---
Date Analyzed	---	04.07.92	---	---	---
Silver (6010)					
Silver, mg/l	80-120 %	0.83/0.87	1.01	82/86 %	75-125 %
Date Analyzed	---	04.02.92	---	---	---
Sodium (6010)					
Sodium , mg/l	80-120 %	*F61	---	---	---
Date Analyzed	---	03.30.92	---	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	85-115 %	3.9/4.19	5.0	78/84 %	85-115 %
Date Analyzed	---	04.01.92	---	---	---
Fluoride					
Fluoride (340.2), mg/l	75-125 %	1.07/1.11	1.0	107/111 %	75-125 %
Date Analyzed	---	04.02.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-7	LCS % Recovery Limits
41321-8	Matrix Spike (MS) Result/Duplicate
41321-9	MS Expected Value
41321-10	MS % Recovery/Duplicate
41321-11	MS % Recovery Limit

PARAMETER	41321-7	41321-8	41321-9	41321-10	41321-11
Nitrate-N					
Nitrate-N (353.2), mg/l	85-115 %	.207/.203	0.20	104/102 %	75-125 %
Date Analyzed	---	03.23.92	---	---	---
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	80-120 %	19.9/25.6	20	100/128 %	75-125 %
Date Analyzed	---	04.02.92	---	---	---
Total Organic Carbon (415.1)					
Total Organic Carbon (9060) , mg/l	60-140 %	115/115	100	115/115 %	60-140 %
Date Analyzed	---	03.23.92	---	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	60-140 %	.096/.096	0.10	96/96 %	60-140 %
Date Analyzed	---	04.06.92	---	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	75-125 %	.187/.217	0.20	94/109 %	75-125 %
Date Analyzed	---	04.07.92	---	---	---

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

41321-12 MS % RPD (Limit)

PARAMETER	41321-12				
Specific Conductance (120.1)					
Specific Conductance	---				
Arsenic (7060)					
Arsenic	0(<20) %				
Barium (6010)					
Barium	7.2(<20) %				
Cadmium (6010)					
Cadmium	6.7(<20) %				
Chromium (6010)					
Chromium	6.2(<20) %				
Iron (6010)					
Iron	---				
Lead (7421)					
Lead	8.0(<20) %				
Manganese (6010)					
Manganese	13(<20) %				
Mercury (7471)					
Mercury	37(<20) %				
Selenium (7740)					
Selenium	---				
Silver (6010)					
Silver	4.8(<20) %				
Sodium (6010)					
Sodium	---				
Chloride (325.2)					
Chloride (325.2)	7.4(<30) %				

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LOG NO: S2-41321

Received: 21 MAR 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO#06711/RANDALL TEXTRON
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	
41321-12	MS % RPD (Limit)	

PARAMETER	41321-12				
Fluoride					
Fluoride (340.2)	3.7(<30) %				
Nitrate-N					
Nitrate-N (353.2)	1.9(<30) %				
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2)	25(<30) %				
Total Organic Carbon (415.1)					
Total Organic Carbon (9060)	0(<40) %				
Total Organic Halogen					
Total Organic Halogen	0(<40) %				
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable	15(<30) %				

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-13	ICVS/CCVS Control Limits
41321-14	ICVS/CCVS Source Lot
41321-15	ICVS/CCVS Expected Value
41321-16	ICVS Result
41321-17	ICVS % Recovery

PARAMETER	41321-13	41321-14	41321-15	41321-16	41321-17
Arsenic (7060)					
Arsenic, mg/l	90-110 %	SPEX	50	54	108 %
Date Analyzed	---	---	---	04.01.92	---
Barium (6010)					
Barium, mg/l	90-110 %	3-159AS	1.0	0.97	97 %
Date Analyzed	---	---	---	03.30.92	---
Cadmium (6010)					
Cadmium, mg/l	90-110 %	3-159AS	1.0	0.99	99 %
Date Analyzed	---	---	---	03.30.92	---
Chromium (6010)					
Chromium, mg/l	90-110 %	3-159AS	1.0	0.99	99 %
Date Analyzed	---	---	---	03.30.92	---
Iron (6010)					
Iron, mg/l	90-110 %	3-159AS	1.0	0.96	96 %
Date Analyzed	---	---	---	03.30.92	---
Lead (7421)					
Lead, mg/l	90-110 %	SPEX	0.050	0.050	100 %
Date Analyzed	---	---	---	03.31.92	---
Manganese (6010)					
Manganese, mg/l	90-110 %	3-159AS	1.0	0.97	97 %
Date Analyzed	---	---	---	03.30.92	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-13	ICVS/CCVS Control Limits
41321-14	ICVS/CCVS Source Lot
41321-15	ICVS/CCVS Expected Value
41321-16	ICVS Result
41321-17	ICVS % Recovery

PARAMETER	41321-13	41321-14	41321-15	41321-16	41321-17
Mercury (7471)					
Mercury, mg/l	80-120 %	EPA 475-1	0.0030	0.0031	103 %
Date Analyzed	---	---	---	04.01.92	---
Selenium (7740)					
Selenium, mg/l	80-120 %	SPEX	0.050	0.055	110 %
Date Analyzed	---	---	---	04.01.92	---
Silver (6010)					
Silver, mg/l	90-110 %	3-128AS	1.01	1.05	104 %
Date Analyzed	---	---	---	04.02.92	---
Sodium (6010)					
Sodium , mg/l	90-110 %	3-128AS	1.0	1.05	105 %
Date Analyzed	---	---	---	03.30.92	---

Methods: EPA SW-846.
*MSD result for Mercury = 0.0011 mg/l.
*F61 = Matrix spikes were not recovered due to the abundance of a target analyte in the sample.
*F62 = Matrix spikes were not recovered due to sample dilution required prior to analysis.

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-18	CCVS Result
41321-19	CCVS % Recovery

PARAMETER	41321-18	41321-19
Arsenic (7060)		
Arsenic, mg/l	51	102 %
Date Analyzed	04.01.92	---
Barium (6010)		
Barium, mg/l	0.99	99 %
Date Analyzed	03.30.92	---
Cadmium (6010)		
Cadmium, mg/l	1.02	102 %
Date Analyzed	03.30.92	---
Chromium (6010)		
Chromium, mg/l	1.03	103 %
Date Analyzed	03.30.92	---
Iron (6010)		
Iron, mg/l	0.98	98 %
Date Analyzed	03.30.92	---
Lead (7421)		
Lead, mg/l	0.053	106 %
Date Analyzed	03.31.92	---
Manganese (6010)		
Manganese, mg/l	1.01	101 %
Date Analyzed	03.30.92	---
Mercury (7471)		
Mercury, mg/l	0.0032	107 %
Date Analyzed	04.01.92	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
41321-18	CCVS Result
41321-19	CCVS % Recovery

PARAMETER	41321-18	41321-19
Selenium (7740)		
Selenium, mg/l	0.057	114 %
Date Analyzed	04.01.92	---
Silver (6010)		
Silver, mg/l	1.07	106 %
Date Analyzed	04.02.92	---
Sodium (6010)		
Sodium , mg/l	1.08	108 %
Date Analyzed	03.30.92	---

Methods: EPA SW-846.
*MSD result for Mercury = 0.0011 mg/l.
*F61 = Matrix spikes were not recovered due to the abundance of a target analyte in the sample.
*F62 = Matrix spikes were not recovered due to sample dilution required prior to analysis.

Janette D. Long

Janette D. Long

APPENDIX C-2

APRIL 1992 RESULTS

SL SAVANNAH LABORATORIES
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5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-42049

Received: 30 APR 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO#06739/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-1	RT-1	04-28-92
42049-2	RT-2	04-28-92
42049-3	RT-3	04-28-92
42049-4	RT-4	04-28-92
42049-5	RT-5	04-28-92

PARAMETER	42049-1	42049-2	42049-3	42049-4	42049-5
Arsenic (7060)					
Arsenic, mg/l	<0.010	<0.010	0.020	<0.010	0.029
Date Analyzed	05.12.92	05.12.92	05.12.92	05.12.92	05.12.92
Barium (6010)					
Barium, mg/l	0.17	0.062	0.20	0.42	0.26
Date Analyzed	05.13.92	05.14.92	05.14.92	05.14.92	05.14.92
Cadmium (6010)					
Cadmium, mg/l	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Date Analyzed	05.13.92	05.14.92	05.14.92	05.14.92	05.14.92
Chromium (6010)					
Chromium, mg/l	0.069	47	85	0.073	0.038
Date Analyzed	05.13.92	05.14.92	05.20.92	05.20.92	05.14.92
Iron (6010)					
Iron, mg/l	24	1.9	34	42	38
Date Analyzed	05.13.92	05.14.92	05.14.92	05.14.92	05.14.92
Lead (7421)					
Lead, mg/l	0.0069	<0.0050	0.018	0.018	0.014
Date Analyzed	05.13.92	05.13.92	05.13.92	05.13.92	05.13.92
Manganese (6010)					
Manganese, mg/l	1.4	0.44	1.2	1.5	4.8
Date Analyzed	05.13.92	05.14.92	05.14.92	05.14.92	05.14.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-1	RT-1	04-28-92
42049-2	RT-2	04-28-92
42049-3	RT-3	04-28-92
42049-4	RT-4	04-28-92
42049-5	RT-5	04-28-92

PARAMETER	42049-1	42049-2	42049-3	42049-4	42049-5
Mercury (7471)					
Mercury, mg/l	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Date Analyzed	05.06.92	05.06.92	05.06.92	05.06.92	05.06.92
Selenium (7740)					
Selenium, mg/l	<0.050*F65	<0.010	<0.010	<0.010	<0.010
Date Analyzed	05.13.92	05.13.92	05.13.92	05.13.92	05.13.92
Silver (6010)					
Silver, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	05.13.92	05.14.92	05.14.92	05.14.92	05.14.92
Sodium (6010)					
Sodium , mg/l	91	76	120	92	100
Date Analyzed	05.20.92	05.20.92	05.20.92	05.20.92	05.20.92
Chloride (325.2)					
Chloride (325.2), mg/l	110	51	96	61	79
Date Analyzed	05.05.92	05.05.92	05.05.92	05.05.92	05.05.92
Fluoride (340.2)					
Fluoride (340.2), mg/l	<0.20	<0.20	0.38	<0.20	<0.20
Date Analyzed	05.18.92	05.18.92	05.18.92	05.18.92	05.18.92
Nitrate-N					
Nitrate-N (353.2), mg/l	0.34	<0.50*F65	<1.0*F65	<0.050	0.11
Date Analyzed	04.30.92	04.30.92	04.30.92	04.30.92	04.30.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-1	RT-1	04-28-92
42049-2	RT-2	04-28-92
42049-3	RT-3	04-28-92
42049-4	RT-4	04-28-92
42049-5	RT-5	04-28-92

PARAMETER	42049-1	42049-2	42049-3	42049-4	42049-5
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	98	94	110	92	130
Date Analyzed	05.04.92	05.04.92	05.04.92	05.04.92	05.04.92
Total Organic Carbon					
Total Organic Carbon , mg/l	3.7	6.5	11	4.8	5.2
Date Analyzed	05.04.92	05.04.92	05.04.92	05.04.92	05.04.92
Total Organic Halogen					
Total Organic Halogen, mg/l	0.23	49	45	1.7	5.9
Date Analyzed	05.14.92	05.15.92	05.15.92	05.14.92	05.14.92
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	<0.020	<0.020	<0.020	<0.020	<0.020
Date Analyzed	05.21.92	05.21.92	05.21.92	05.21.92	05.21.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-1	RT-1	04-28-92
42049-2	RT-2	04-28-92
42049-3	RT-3	04-28-92
42049-4	RT-4	04-28-92
42049-5	RT-5	04-28-92

PARAMETER	42049-1	42049-2	42049-3	42049-4	42049-5
Purgeables (624)					
Benzene, ug/l	<5.0	<2500	<2500	<83	<250
Bromodichloromethane, ug/l	<5.0	<2500	<2500	<83	<250
Bromoform, ug/l	<5.0	<2500	<2500	<83	<250
Bromomethane, ug/l	<10	<5000	<5000	<170	<500
Carbon Tetrachloride, ug/l	<5.0	<2500	<2500	<83	<250
Chlorobenzene, ug/l	<5.0	<2500	<2500	<83	<250
Chloroethane, ug/l	<10	<5000	<5000	<170	<500
2-Chloroethylvinyl Ether, ug/l	<50	<25000	<25000	<830	<2500
Chloroform, ug/l	<5.0	<2500	<2500	<83	<250
Chloromethane, ug/l	<10	<5000	<5000	<170	<500
Dibromochloromethane, ug/l	<5.0	<2500	<2500	<83	<250
1,2-Dichlorobenzene, ug/l	<5.0	<2500	<2500	<83	<250
1,3-Dichlorobenzene, ug/l	<5.0	<2500	<2500	<83	<250
1,4-Dichlorobenzene, ug/l	<5.0	<2500	<2500	<83	<250
1,1-Dichloroethane, ug/l	<5.0	<2500	<2500	<83	<250
1,2-Dichloroethane, ug/l	<5.0	<2500	<2500	<83	<250
1,1-Dichloroethene, ug/l	<5.0	<2500	<2500	<83	<250
Trans-1,2-Dichloroethylene, ug/l	<5.0	<2500	<2500	<83	<250
1,2-Dichloropropane, ug/l	<5.0	<2500	<2500	<83	<250

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-1	RT-1	04-28-92
42049-2	RT-2	04-28-92
42049-3	RT-3	04-28-92
42049-4	RT-4	04-28-92
42049-5	RT-5	04-28-92

PARAMETER	42049-1	42049-2	42049-3	42049-4	42049-5
Cis-1,3-Dichloropropene, ug/l	<5.0	<2500	<2500	<83	<250
Trans-1,3-Dichloropropene, ug/l	<5.0	<2500	<2500	<83	<250
Ethylbenzene, ug/l	<5.0	<2500	<2500	<83	<250
Methylene Chloride, ug/l	<5.0	<2500	<2500	<83	<250
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<2500	<2500	<83	<250
Tetrachloroethene, ug/l	<5.0	<2500	<2500	<83	<250
Toluene, ug/l	<5.0	<2500	<2500	<83	<250
1,1,1-Trichloroethane, ug/l	<5.0	<2500	<2500	<83	<250
1,1,2-Trichloroethane, ug/l	<5.0	<2500	<2500	<83	<250
Trichloroethene, ug/l	130	90000	52000	500	7700
Trichlorofluoromethane, ug/l	<5.0	<2500	<2500	<83	<250
Vinyl Chloride, ug/l	<10	<5000	<5000	560	<500
Cis-1,2-Dichloroethene, ug/l	5.5	4500	3800	3000	4800
Surrogate - Toluene-d8	93 %	96 %	86 %	80 %	97 %
Surrogate - 4-Bromofluorobenzene	98 %	100 %	92 %	91 %	103 %
Surrogate - 1,2-Dichloroethane-d4	97 %	95 %	102 %	92 %	105 %
Date Analyzed	05.11.92	05.11.92	05.11.92	05.11.92	05.11.92
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	560	550	780	500	720
Date Analyzed	04.30.92	04.30.92	04.30.92	04.30.92	04.30.92

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-1	RT-1	04-28-92
42049-2	RT-2	04-28-92
42049-3	RT-3	04-28-92
42049-4	RT-4	04-28-92
42049-5	RT-5	04-28-92

PARAMETER	42049-1	42049-2	42049-3	42049-4	42049-5
pH (150.1)					
pH (150.1), units	6.6	6.6	6.7	6.5	7.2
Date Analyzed	05.06.92	05.06.92	05.06.92	05.06.92	05.06.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-6	Field Blank	04-28-92

PARAMETER	42049-6
Arsenic (7060)	
Arsenic, mg/l	<0.010
Date Analyzed	05.12.92
Barium (6010)	
Barium, mg/l	<0.010
Date Analyzed	05.14.92
Cadmium (6010)	
Cadmium, mg/l	<0.0050
Date Analyzed	05.14.92
Chromium (6010)	
Chromium, mg/l	<0.010
Date Analyzed	05.14.92
Iron (6010)	
Iron, mg/l	<0.050
Date Analyzed	05.14.92
Lead (7421)	
Lead, mg/l	<0.0050
Date Analyzed	05.14.92
Manganese (6010)	
Manganese, mg/l	<0.010
Date Analyzed	05.14.92
Mercury (7471)	
Mercury, mg/l	<0.00020
Date Analyzed	05.07.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-6	Field Blank	04-28-92

PARAMETER	42049-6
Selenium (7740)	
Selenium, mg/l	<0.010
Date Analyzed	05.13.92
Silver (6010)	
Silver, mg/l	<0.010
Date Analyzed	05.14.92
Sodium (6010)	
Sodium , mg/l	0.50
Date Analyzed	05.20.92
Chloride (325.2)	
Chloride (325.2), mg/l	<1.0
Date Analyzed	05.05.92
Fluoride (340.2)	
Fluoride (340.2), mg/l	<0.20
Date Analyzed	05.18.92
Nitrate-N	
Nitrate-N (353.2), mg/l	<0.050
Date Analyzed	04.30.92
Sulfate as SO4 (9035)	
Sulfate as SO4 (375.2), mg/l	<5.0
Date Analyzed	05.04.92
Total Organic Carbon	
Total Organic Carbon , mg/l	2.2
Date Analyzed	05.04.92

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Project: TN20001/TO#06739/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-6	Field Blank	04-28-92

PARAMETER	42049-6
Total Organic Halogen	
Total Organic Halogen, mg/l	0.016
Date Analyzed	05.14.92
Phenolics, Total Recoverable (9065)	
Phenolics,Total Recoverable, mg/l	<0.020
Date Analyzed	05.21.92

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Project: TN20001/TO#06739/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-6	Field Blank	04-28-92

PARAMETER	42049-6
Purgeables (624)	
Benzene, ug/l	<5.0
Bromodichloromethane, ug/l	<5.0
Bromoform, ug/l	<5.0
Bromomethane, ug/l	<10
Carbon Tetrachloride, ug/l	<5.0
Chlorobenzene, ug/l	<5.0
Chloroethane, ug/l	<10
2-Chloroethylvinyl Ether, ug/l	<50
Chloroform, ug/l	<5.0
Chloromethane, ug/l	<10
Dibromochloromethane, ug/l	<5.0
1,2-Dichlorobenzene, ug/l	<5.0
1,3-Dichlorobenzene, ug/l	<5.0
1,4-Dichlorobenzene, ug/l	<5.0
1,1-Dichloroethane, ug/l	<5.0
1,2-Dichloroethane, ug/l	<5.0
1,1-Dichloroethene, ug/l	<5.0
Trans-1,2-Dichloroethylene, ug/l	<5.0
1,2-Dichloropropane, ug/l	<5.0
Cis-1,3-Dichloropropene, ug/l	<5.0
Trans-1,3-Dichloropropene, ug/l	<5.0
Ethylbenzene, ug/l	<5.0
Methylene Chloride, ug/l	<5.0

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LOG NO: S2-42049
Revision 1
Received: 30 APR 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO#06739/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-6	Field Blank	04-28-92

PARAMETER	42049-6
1,1,2,2-Tetrachloroethane, ug/l	<5.0
Tetrachloroethene, ug/l	<5.0
Toluene, ug/l	<5.0
1,1,1-Trichloroethane, ug/l	<5.0
1,1,2-Trichloroethane, ug/l	<5.0
Trichloroethene, ug/l	<5.0
Trichlorofluoromethane, ug/l	<5.0
Vinyl Chloride, ug/l	<10
Cis-1,2-Dichloroethene, ug/l	<5.0
Surrogate - Toluene-d8	95 %
Surrogate - 4-Bromofluorobenzene	99 %
Surrogate - 1,2-Dichloroethane-d4	102 %
Date Analyzed	05.10.92
Specific Conductance (120.1)	
Specific Conductance, umhos/cm	3.2
Date Analyzed	04.30.92
pH (150.1)	
pH (150.1), units	6.5
Date Analyzed	05.06.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-7	Trip Blank	04-28-92

PARAMETER	42049-7
Purgeables (624)	
Benzene, ug/l	<5.0
Bromodichloromethane, ug/l	<5.0
Bromoform, ug/l	<5.0
Bromomethane, ug/l	<10
Carbon Tetrachloride, ug/l	<5.0
Chlorobenzene, ug/l	<5.0
Chloroethane, ug/l	<10
2-Chloroethylvinyl Ether, ug/l	<50
Chloroform, ug/l	<5.0
Chloromethane, ug/l	<10
Dibromochloromethane, ug/l	<5.0
1,2-Dichlorobenzene, ug/l	<5.0
1,3-Dichlorobenzene, ug/l	<5.0
1,4-Dichlorobenzene, ug/l	<5.0
1,1-Dichloroethane, ug/l	<5.0
1,2-Dichloroethane, ug/l	<5.0
1,1-Dichloroethene, ug/l	<5.0
Trans-1,2-Dichloroethylene, ug/l	<5.0
1,2-Dichloropropane, ug/l	<5.0
Cis-1,3-Dichloropropene, ug/l	<5.0
Trans-1,3-Dichloropropene, ug/l	<5.0
Ethylbenzene, ug/l	<5.0
Methylene Chloride, ug/l	<5.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42049-7	Trip Blank	04-28-92

PARAMETER	42049-7
1,1,2,2-Tetrachloroethane, ug/l	<5.0
Tetrachloroethene, ug/l	<5.0
Toluene, ug/l	<5.0
1,1,1-Trichloroethane, ug/l	<5.0
1,1,2-Trichloroethane, ug/l	<5.0
Trichloroethene, ug/l	<5.0
Trichlorofluoromethane, ug/l	<5.0
Vinyl Chloride, ug/l	<10
Cis-1,2-Dichloroethene, ug/l	<5.0
Surrogate - Toluene-d8	93 %
Surrogate - 4-Bromofluorobenzene	93 %
Surrogate - 1,2-Dichloroethane-d4	95 %
Date Analyzed	05.10.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-8	Detection Limits - Liquid
42049-9	Method Blank Result
42049-10	Lab Control Standard (LCS) Result
42049-11	LCS Expected Value
42049-12	LCS % Recovery

PARAMETER	42049-8	42049-9	42049-10	42049-11	42049-12
Arsenic (7060)					
Arsenic, mg/l	0.010	<0.010	0.049	0.050	98 %
Date Analyzed	---	05.12.92	05.12.92	---	---
Barium (6010)					
Barium, mg/l	0.010	<0.010	0.922	1.0	92 %
Date Analyzed	---	05.13.92	05.13.92	---	---
Cadmium (6010)					
Cadmium, mg/l	0.0050	<0.0050	0.939	1.0	94 %
Date Analyzed	---	05.13.92	05.13.92	---	---
Chromium (6010)					
Chromium, mg/l	0.010	<0.010	0.973	1.0	97 %
Date Analyzed	---	05.13.92	05.13.92	---	---
Iron (6010)					
Iron, mg/l	0.050	<0.050	0.957	1.0	96 %
Date Analyzed	---	05.13.92	05.13.92	---	---
Lead (7421)					
Lead, mg/l	0.0050	<0.0050	0.054	0.050	108 %
Date Analyzed	---	05.13.92	05.13.92	---	---
Manganese (6010)					
Manganese, mg/l	0.010	<0.010	0.955	1.0	96 %
Date Analyzed	---	05.13.92	05.13.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-8	Detection Limits - Liquid
42049-9	Method Blank Result
42049-10	Lab Control Standard (LCS) Result
42049-11	LCS Expected Value
42049-12	LCS % Recovery

PARAMETER	42049-8	42049-9	42049-10	42049-11	42049-12
Mercury (7471)					
Mercury, mg/l	0.00020	<0.00020	0.0032	0.0030	107 %
Date Analyzed	---	05.06.92	05.06.92	---	---
Selenium (7740)					
Selenium, mg/l	0.010	<0.010	0.048	0.050	96 %
Date Analyzed	---	05.13.92	05.16.92	---	---
Silver (6010)					
Silver, mg/l	0.010	<0.010	0.861	1.01	85 %
Date Analyzed	---	05.13.92	05.13.92	---	---
Sodium (6010)					
Sodium , mg/l	0.50	<0.50	0.942	0.998	94 %
Date Analyzed	---	05.20.92	05.20.92	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	1.0	<1.0	8.81	7.7	114 %
Date Analyzed	---	05.05.92	05.05.92	---	---
Fluoride (340.2)					
Fluoride (340.2), mg/l	0.20	<0.20	2.12	2.16	98 %
Date Analyzed	---	05.18.92	05.18.92	---	---
Nitrate-N					
Nitrate-N (353.2), mg/l	0.050	<0.050	0.355	0.383	93 %
Date Analyzed	---	04.30.92	04.30.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-8	Detection Limits - Liquid
42049-9	Method Blank Result
42049-10	Lab Control Standard (LCS) Result
42049-11	LCS Expected Value
42049-12	LCS % Recovery

PARAMETER	42049-8	42049-9	42049-10	42049-11	42049-12
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	5.0	<5.0	24.7	27.6	89 %
Date Analyzed	---	05.04.92	05.04.92	---	---
Total Organic Carbon					
Total Organic Carbon , mg/l	1.0	<1.0	45.9	43	107 %
Date Analyzed	---	05.04.92	05.04.92	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	0.010	<0.010	0.102	0.10	102 %
Date Analyzed	---	05.14.92	05.14.92	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	0.010	<0.010	0.168	0.134	125 %
Date Analyzed	---	05.21.92	05.21.92	---	---

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-8	Detection Limits - Liquid
42049-9	Method Blank Result
42049-10	Lab Control Standard (LCS) Result
42049-11	LCS Expected Value
42049-12	LCS % Recovery

PARAMETER	42049-8	42049-9	42049-10	42049-11	42049-12
Purgeables (624)					
Benzene, ug/l	5.0	<5.0	50.4	50	101 %
Bromodichloromethane, ug/l	5.0	<5.0	---	---	---
Bromoform, ug/l	5.0	<5.0	---	---	---
Bromomethane, ug/l	10	<10	---	---	---
Carbon Tetrachloride, ug/l	5.0	<5.0	---	---	---
Chlorobenzene, ug/l	5.0	<5.0	49.7	50	99 %
Chloroethane, ug/l	10	<10	---	---	---
2-Chloroethylvinyl Ether, ug/l	50	<50	---	---	---
Chloroform, ug/l	5.0	<5.0	---	---	---
Chloromethane, ug/l	10	<10	---	---	---
Dibromochloromethane, ug/l	5.0	<5.0	---	---	---
1,2-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,3-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,4-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,1-Dichloroethane, ug/l	5.0	<5.0	---	---	---
1,2-Dichloroethane, ug/l	5.0	<5.0	---	---	---
1,1-Dichloroethene, ug/l	5.0	<5.0	57.3	50	115 %
Trans-1,2-Dichloroethylene, ug/l	5.0	<5.0	---	---	---
1,2-Dichloropropane, ug/l	5.0	<5.0	---	---	---

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

42049-8	Detection Limits - Liquid
42049-9	Method Blank Result
42049-10	Lab Control Standard (LCS) Result
42049-11	LCS Expected Value
42049-12	LCS % Recovery

PARAMETER	42049-8	42049-9	42049-10	42049-11	42049-12
Cis-1,3-Dichloropropene, ug/l	5.0	<5.0	---	---	---
Trans-1,3-Dichloropropene, ug/l	5.0	<5.0	---	---	---
Ethylbenzene, ug/l	5.0	<5.0	---	---	---
Methylene Chloride, ug/l	5.0	<5.0	---	---	---
1,1,2,2-Tetrachloroethane, ug/l	5.0	<5.0	---	---	---
Tetrachloroethene, ug/l	5.0	<5.0	---	---	---
Toluene, ug/l	5.0	<5.0	50.4	50	101 %
1,1,1-Trichloroethane, ug/l	5.0	<5.0	---	---	---
1,1,2-Trichloroethane, ug/l	5.0	<5.0	---	---	---
Trichloroethene, ug/l	5.0	<5.0	46.6	50	93 %
Trichlorofluoromethane, ug/l	5.0	<5.0	---	---	---
Vinyl Chloride, ug/l	10	<10	---	---	---
Cis-1,2-Dichloroethene, ug/l	5.0	<5.0	---	---	---
Surrogate - Toluene-d8	---	90 %	95 %	---	---
Surrogate - 4-Bromofluorobenzene	---	91 %	94 %	---	---
Surrogate - 1,2-Dichloroethane-d4	---	101 %	96 %	---	---
Date Analyzed	---	05.10.92	05.10.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-13	LCS % Recovery Limits
42049-14	Matrix Spike (MS) Result/Duplicate
42049-15	MS Expected Value
42049-16	MS % Recovery/Duplicate
42049-17	MS % Recovery Limit

PARAMETER	42049-13	42049-14	42049-15	42049-16	42049-17
Arsenic (7060)					
Arsenic	80-120 %	.052/.052	0.050	104/104 %	75-125 %
Date Analyzed	---	05.12.92	---	---	---
Barium (6010)					
Barium	80-120 %	0.87/.879	1.0	87/88 %	75-125 %
Date Analyzed	---	05.14.92	---	---	---
Cadmium (6010)					
Cadmium	80-120 %	.919/.905	1.0	92/91 %	75-125 %
Date Analyzed	---	05.14.92	---	---	---
Chromium (6010)					
Chromium	80-120 %	.917/.927	1.0	92/93 %	75-125 %
Date Analyzed	---	05.13.92	---	---	---
Iron (6010)					
Iron	80-120 %	*F61	---	---	---
Date Analyzed	---	05.14.92	---	---	---
Lead (7421)					
Lead	80-120 %	.053/.056	0.050	106/112 %	75-125 %
Date Analyzed	---	05.13.92	---	---	---
Manganese (6010)					
Manganese	80-120 %	.965/.981	1.0	97/98 %	75-125 %
Date Analyzed	---	05.14.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-13	LCS % Recovery Limits
42049-14	Matrix Spike (MS) Result/Duplicate
42049-15	MS Expected Value
42049-16	MS % Recovery/Duplicate
42049-17	MS % Recovery Limit

PARAMETER	42049-13	42049-14	42049-15	42049-16	42049-17
Mercury (7471)					
Mercury	80-120 %	0.00094/*	0.0010	94/98 %	75-125 %
Date Analyzed	---	05.06.92	---	---	---
Selenium (7740)					
Selenium	80-120 %	.030/.038	0.050	60/76 %	75-125 %
Date Analyzed	---	05.13.92	---	---	---
Silver (6010)					
Silver	80-120 %	.947/.893	1.01	94/88 %	75-125 %
Date Analyzed	---	05.13.92	---	---	---
Sodium (6010)					
Sodium	80-120 %	*F61	---	---	---
Date Analyzed	---	05.20.92	---	---	---
Chloride (325.2)					
Chloride (325.2)	85-115 %	4.1/4.69	5.0	82/94 %	75-125 %
Date Analyzed	---	05.05.92	---	---	---
Fluoride (340.2)					
Fluoride (340.2)	75-125 %	2.04/2.12	2.0	102/106 %	75-125 %
Date Analyzed	---	05.18.92	---	---	---
Nitrate-N					
Nitrate-N (353.2)	85-115 %	.201/.204	0.20	101/102 %	75-125 %
Date Analyzed	---	05.04.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-13	LCS % Recovery Limits
42049-14	Matrix Spike (MS) Result/Duplicate
42049-15	MS Expected Value
42049-16	MS % Recovery/Duplicate
42049-17	MS % Recovery Limit

PARAMETER	42049-13	42049-14	42049-15	42049-16	42049-17
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2)	80-120 %	20.4/21.6	20	102/108 %	75-125 %
Date Analyzed	---	05.04.92	---	---	---
Total Organic Carbon					
Total Organic Carbon	60-140 %	108/107 %	100	108/107 %	60-140 %
Date Analyzed	---	05.04.92	---	---	---
Total Organic Halogen					
Total Organic Halogen	60-140 %	.103/.139	0.10	103/139 %	60-140 %
Date Analyzed	---	05.15.92	---	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable	75-125 %	.174/.173	0.20	87/87 %	75-125 %
Date Analyzed	---	05.21.92	---	---	---
Purgeables (624)					
Benzene	73-144 %	54.4/49.7	50	109/99 %	73-144 %
Chlorobenzene	68-136 %	51.5/47.8	50	103/96 %	68-136 %
1,1-Dichloroethene	60-136 %	60.8/55.1	50	122/110 %	60-136 %
Toluene	68-138 %	50.1/47.7	50	100/95 %	68-138 %
Trichloroethene	66-136 %	160/158	180	89/88 %	66-136 %
Surrogate - Toluene-d8	77-120 %	91/83 %	---	---	77-120 %
Surrogate - 4-Bromofluorobenzene	80-125 %	95/89 %	---	---	80-125 %
Surrogate - 1,2-Dichloroethane-d4	80-125 %	101/86 %	---	---	80-125 %
Date Analyzed	---	05.10.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-18	MS % RPD (Limit)

PARAMETER	42049-18
Arsenic (7060)	
Arsenic	0(<20)%
Barium (6010)	
Barium	1.1(<20)%
Cadmium (6010)	
Cadmium	1.1(<20)%
Chromium (6010)	
Chromium	1.1(<20)%
Iron (6010)	
Iron	---
Lead (7421)	
Lead	5.5(<20)%
Manganese (6010)	
Manganese	1.0(<20)%
Mercury (7471)	
Mercury	4.1(<20)%
Selenium (7740)	
Selenium	24(<20)%
Silver (6010)	
Silver	6.6(<20)%
Sodium (6010)	
Sodium	---
Chloride (325.2)	
Chloride (325.2)	14(<30)%
Fluoride (340.2)	
Fluoride (340.2)	3.8(<30)%

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-18	MS % RPD (Limit)

PARAMETER	42049-18
Nitrate-N	
Nitrate-N (353.2)	0.99(<30)%
Sulfate as SO4 (9035)	
Sulfate as SO4 (375.2)	5.7(<30)%
Total Organic Carbon	
Total Organic Carbon	0.93(<40)%
Total Organic Halogen	
Total Organic Halogen	30(<40)%
Phenolics, Total Recoverable (9065)	
Phenolics,Total Recoverable	0(<30)%
Purgeables (624)	
Benzene	9.6(<22)%
Chlorobenzene	7.0(<17)%
1,1-Dichloroethene	10(<19)%
Toluene	5.1(<17)%
Trichloroethene	1.1(<20)%

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

42049-19 ICVS/CCVS Control Limits
42049-20 ICVS/CCVS Source Lot
42049-21 ICVS/CCVS Expected Value
42049-22 ICVS Results
42049-23 ICVS % Recovery

PARAMETER	42049-19	42049-20	42049-21	42049-22	42049-23
Arsenic (7060)					
Arsenic, mg/l	90-110 %	SPEX	0.050	0.051	102 %
Date Analyzed	---	---	---	05.12.92	---
Barium (6010)					
Barium, mg/l	90-110 %	3-128	1.0	1.08	108 %
Date Analyzed	---	---	---	05.13.92	---
Cadmium (6010)					
Cadmium, mg/l	90-110 %	3-159	1.0	1.04	104 %
Date Analyzed	---	---	---	05.13.92	---
Chromium (6010)					
Chromium, mg/l	90-110 %	3-159	1.0	1.06	106 %
Date Analyzed	---	---	---	05.13.92	---
Iron (6010)					
Iron, mg/l	90-110 %	3-159	1.0	0.955	96 %
Date Analyzed	---	---	---	05.13.92	---
Lead (7421)					
Lead, mg/l	90-110 %	SPEX	0.050	0.053	106 %
Date Analyzed	---	---	---	05.13.92	---
Manganese (6010)					
Manganese, mg/l	90-110 %	3-159	1.0	1.07	107 %
Date Analyzed	---	---	---	05.13.92	---

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LOG NO: S2-42049

Received: 30 APR 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/TO#06739/Randall Textron
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-19	ICVS/CCVS Control Limits
42049-20	ICVS/CCVS Source Lot
42049-21	ICVS/CCVS Expected Value
42049-22	ICVS Results
42049-23	ICVS % Recovery

PARAMETER	42049-19	42049-20	42049-21	42049-22	42049-23
Mercury (7471)					
Mercury, mg/l	80-120 %	475-1EPA	0.0030	0.0032	107 %
Date Analyzed	---	---	---	05.06.92	---
Selenium (7740)					
Selenium, mg/l	90-110 %	SPEX	0.050	0.050	100 %
Date Analyzed	---	---	---	05.13.92	---
Silver (6010)					
Silver, mg/l	90-110 %	3-128	1.01	1.06	105 %
Date Analyzed	---	---	---	05.13.92	---
Sodium (6010)					
Sodium , mg/l	90-110 %	3/128AS	0.998	0.998	100 %
Date Analyzed	---	---	---	05.20.92	---

Methods: EPA SW-846 & 40 CFR Part 136

*F61 - Matrix Spikes were not recovered due to the abundance of a target analyte in the sample.

*F65 - Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

*Mercury MS duplicate result = 0.00098 mg/l

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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42049-24	CCVS Result
42049-25	CCVS % Recovery

PARAMETER	42049-24	42049-25
Arsenic (7060)		
Arsenic, mg/l	0.050	100 %
Date Analyzed	05.12.92	---
Barium (6010)		
Barium, mg/l	1.10	110 %
Date Analyzed	05.13.92	---
Cadmium (6010)		
Cadmium, mg/l	1.01	101 %
Date Analyzed	05.13.92	---
Chromium (6010)		
Chromium, mg/l	1.06	106 %
Date Analyzed	05.13.92	---
Iron (6010)		
Iron, mg/l	0.953	95 %
Date Analyzed	05.13.92	---
Lead (7421)		
Lead, mg/l	0.052	104 %
Date Analyzed	05.13.92	---
Manganese (6010)		
Manganese, mg/l	1.06	106 %
Date Analyzed	05.13.92	---
Mercury (7471)		
Mercury, mg/l	0.0032	107 %
Date Analyzed	05.06.92	---

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

42049-24 CCVS Result
42049-25 CCVS % Recovery

PARAMETER	42049-24	42049-25
Selenium (7740)		
Selenium, mg/l	0.050	100 %
Date Analyzed	05.13.92	---
Silver (6010)		
Silver, mg/l	1.05	104 %
Date Analyzed	05.13.92	---
Sodium (6010)		
Sodium , mg/l	1.10	110 %
Date Analyzed	05.20.92	---

Methods: EPA SW-846 & 40 CFR Part 136

*F61 - Matrix Spikes were not recovered due to the abundance of a target analyte in the sample.

*F65 - Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

*Mercury MS duplicate result = 0.00098 mg/l

Janette D. Long

APPENDIX C-3

MAY 1992 RESULTS

SL SAVANNAH LABORATORIES
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5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-42584

Received: 30 MAY 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-1	RT-1	05-28-92
42584-2	RT-2	05-28-92
42584-3	RT-3	05-28-92
42584-4	RT-4	05-28-92
42584-5	RT-5	05-28-92

PARAMETER	42584-1	42584-2	42584-3	42584-4	42584-5
pH (150.1)					
pH (150.1), units	5.7	6.0	6.4	6.5	6.3
Date Analyzed	06.01.92	06.01.92	06.01.92	06.01.92	06.01.92
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	570	650	790	610	690
Date Analyzed	06.01.92	06.01.92	06.01.92	06.01.92	06.01.92
Arsenic (7060)					
Arsenic, mg/l	<0.010	<0.010	0.019	<0.010	<0.010
Date Analyzed	06.04.92	06.04.92	06.04.92	06.04.92	06.04.92
Barium (6010)					
Barium, mg/l	0.062	0.070	0.18	0.13	0.11
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92
Cadmium (6010)					
Cadmium, mg/l	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92
Chromium (6010)					
Chromium, mg/l	0.013	51	81	0.11	<0.010
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92
Iron (6010)					
Iron, mg/l	4.0	1.7	27	7.7	1.8
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92

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LOG NO: S2-42584
Revision 1
Received: 30 MAY 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-1	RT-1	05-28-92
42584-2	RT-2	05-28-92
42584-3	RT-3	05-28-92
42584-4	RT-4	05-28-92
42584-5	RT-5	05-28-92

PARAMETER	42584-1	42584-2	42584-3	42584-4	42584-5
Lead (7421)					
Lead , mg/l	<0.0050	<0.0050	0.019	0.0056	<0.0050
Date Analyzed	06.11.92	06.11.92	06.11.92	06.11.92	06.11.92
Manganese (6010)					
Manganese, mg/l	0.62	0.38	1.2	1.4	3.1
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92
Mercury (7470)					
Mercury, mg/l	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Date Analyzed	06.02.92	06.02.92	06.02.92	06.02.92	06.02.92
Selenium (7740)					
Selenium, mg/l	<0.020*F65	<0.020*F65	<0.020*F65	<0.020*F65	<0.020*F65
Date Analyzed	06.04.92	06.04.92	06.04.92	06.04.92	06.04.92
Silver (6010)					
Silver, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92
Sodium (6010)					
Sodium , mg/l	87	83	110	100	87
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92
Chloride (325.2)					
Chloride (325.2), mg/l	90	59	83	54	97
Date Analyzed	06.15.92	06.15.92	06.15.92	06.15.92	06.15.92

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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-1	RT-1	05-28-92
42584-2	RT-2	05-28-92
42584-3	RT-3	05-28-92
42584-4	RT-4	05-28-92
42584-5	RT-5	05-28-92

PARAMETER	42584-1	42584-2	42584-3	42584-4	42584-5
Nitrate-N					
Nitrate-N (353.2), mg/l	0.37	<0.50*F65	<1.0*F65	0.19	0.57
Date Analyzed	06.01.92	06.01.92	06.01.92	06.01.92	06.01.92
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	110	97	110	110	150
Date Analyzed	06.10.92	06.10.92	06.10.92	06.10.92	06.10.92
Total Organic Carbon					
Total Organic Carbon , mg/l	4.7	14	14	3.8	3.3
Date Analyzed	06.03.92	06.03.92	06.03.92	06.03.92	06.03.92
Total Organic Halogen					
Total Organic Halogen, mg/l	0.11	59	32	2.3	5.5
Date Analyzed	06.08.92	06.08.92	06.08.92	06.08.92	06.08.92
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	06.15.92	06.15.92	06.15.92	06.15.92	06.15.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-1	RT-1	05-28-92
42584-2	RT-2	05-28-92
42584-3	RT-3	05-28-92
42584-4	RT-4	05-28-92
42584-5	RT-5	05-28-92

PARAMETER	42584-1	42584-2	42584-3	42584-4	42584-5
Purgeables (624)					
Benzene, ug/l	<5.0	<5000	<2500	<250	<250
Bromodichloromethane, ug/l	<5.0	<5000	<2500	<250	<250
Bromoform, ug/l	<5.0	<5000	<2500	<250	<250
Bromomethane, ug/l	<10	<10000	<5000	<500	<500
Carbon Tetrachloride, ug/l	<5.0	<5000	<2500	<250	<250
Chlorobenzene, ug/l	<5.0	<5000	<2500	<250	<250
Chloroethane, ug/l	<10	<10000	<5000	<500	<500
2-Chloroethylvinyl Ether, ug/l	<50	<50000	<25000	<2500	<2500
Chloroform, ug/l	<5.0	<5000	<2500	<250	<250
Chloromethane, ug/l	<10	<10000	<5000	<500	<500
Dibromochloromethane, ug/l	<5.0	<5000	<2500	260	<250
1,2-Dichlorobenzene, ug/l	<5.0	<5000	<2500	<250	<250
1,3-Dichlorobenzene, ug/l	<5.0	<5000	<2500	<250	<250
1,4-Dichlorobenzene, ug/l	<5.0	<5000	<2500	<250	<250
1,1-Dichloroethane, ug/l	<5.0	<5000	<2500	<250	<250
1,2-Dichloroethane, ug/l	<5.0	<5000	<2500	<250	<250
1,1-Dichloroethene, ug/l	<5.0	<5000	<2500	<250	<250
Trans-1,2-Dichloroethene, ug/l	<5.0	<5000	<2500	<250	<250
1,2-Dichloropropane, ug/l	<5.0	<5000	<2500	<250	<250

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Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-1	RT-1	05-28-92
42584-2	RT-2	05-28-92
42584-3	RT-3	05-28-92
42584-4	RT-4	05-28-92
42584-5	RT-5	05-28-92

PARAMETER	42584-1	42584-2	42584-3	42584-4	42584-5
Cis-1,3-Dichloropropene, ug/l	<5.0	<5000	<2500	<250	<250
Trans-1,3-Dichloropropene, ug/l	<5.0	<5000	<2500	<250	<250
Ethylbenzene, ug/l	<5.0	<5000	<2500	<250	<250
Methylene Chloride, ug/l	<5.0	<5000	<2500	<250	<250
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<5000	<2500	<250	<250
Tetrachloroethene, ug/l	<5.0	<5000	<2500	<250	<250
Toluene, ug/l	<5.0	<5000	<2500	<250	<250
1,1,1-Trichloroethane, ug/l	<5.0	<5000	<2500	<250	<250
1,1,2-Trichloroethane, ug/l	<5.0	<5000	<2500	<250	<250
Trichloroethene, ug/l	170	130000	50000	860	9400
Trichlorofluoromethane, ug/l	<5.0	<5000	<2500	<250	<250
Vinyl Chloride, ug/l	<10	<10000	<5000	1100	<500
Cis-1,2-Dichloroethene, ug/l	5.2	5700	3900	5200	4300
Surrogate - Toluene-d8	90 %	88 %	92 %	90 %	92 %
Surrogate - 4-Bromofluorobenzene	104 %	100 %	101 %	108 %	102 %
Surrogate - 1,2-Dichloroethane-d4	92 %	98 %	95 %	108 %	106 %
Date Analyzed	06.03.92	06.04.92	06.04.92	06.04.92	06.04.92
Fluoride (340.2)					
Fluoride (340.2), mg/l	<0.20	<0.20	0.38	0.20	<0.20
Date Analyzed	06.12.92	06.12.92	06.12.92	06.12.92	06.12.92

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Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-6	RT-003	05-28-92
42584-7	Field Blank	05-28-92

PARAMETER	42584-6	42584-7
pH (150.1)		
pH (150.1), units	6.1	8.4
Date Analyzed	06.01.92	06.01.92
Specific Conductance (120.1)		
Specific Conductance, umhos/cm	780	3.4
Date Analyzed	06.01.92	06.01.92
Arsenic (7060)		
Arsenic, mg/l	0.010	<0.010
Date Analyzed	06.04.92	06.04.92
Barium (6010)		
Barium, mg/l	0.12	<0.010
Date Analyzed	06.12.92	06.12.92
Cadmium (6010)		
Cadmium, mg/l	<0.0050	<0.0050
Date Analyzed	06.12.92	06.12.92
Chromium (6010)		
Chromium, mg/l	77	<0.010
Date Analyzed	06.12.92	06.12.92
Iron (6010)		
Iron, mg/l	13	<0.050
Date Analyzed	06.12.92	06.12.92
Lead (7421)		
Lead, mg/l	0.010	<0.0050
Date Analyzed	06.11.92	06.11.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-6	RT-003	05-28-92
42584-7	Field Blank	05-28-92

PARAMETER	42584-6	42584-7
Manganese (6010)		
Manganese, mg/l	0.70	<0.010
Date Analyzed	06.12.92	06.12.92
Mercury (7470)		
Mercury, mg/l	<0.00020	<0.00020
Date Analyzed	06.02.92	06.02.92
Selenium (7740)		
Selenium, mg/l	<0.020*F65	<0.020*F65
Date Analyzed	06.04.92	06.04.92
Silver (6010)		
Silver, mg/l	<0.010	<0.010
Date Analyzed	06.12.92	06.12.92
Sodium (6010)		
Sodium , mg/l	100	<0.50
Date Analyzed	06.12.92	06.12.92
Chloride (325.2)		
Chloride (325.2), mg/l	79	<1.0
Date Analyzed	06.15.92	06.15.92
Nitrate-N		
Nitrate-N (353.2), mg/l	<1.0*F65	<0.050
Date Analyzed	06.01.92	06.01.92
Sulfate as SO4 (9035)		
Sulfate as SO4 (375.2), mg/l	110	<5.0
Date Analyzed	06.10.92	06.10.92

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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-6	RT-003	05-28-92
42584-7	Field Blank	05-28-92

PARAMETER	42584-6	42584-7
Total Organic Carbon		
Total Organic Carbon , mg/l	5.5	1.1
Date Analyzed	06.03.92	06.03.92
Total Organic Halogen		
Total Organic Halogen, mg/l	31	<0.010
Date Analyzed	06.08.92	06.08.92
Phenolics, Total Recoverable (9065)		
Phenolics,Total Recoverable, mg/l	<0.010	<0.010
Date Analyzed	06.15.92	06.15.92

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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-6	RT-003	05-28-92
42584-7	Field Blank	05-28-92

PARAMETER	42584-6	42584-7
Purgeables (624)		
Benzene, ug/l	<2500	<5.0
Bromodichloromethane, ug/l	<2500	<5.0
Bromoform, ug/l	<2500	<5.0
Bromomethane, ug/l	<5000	<10
Carbon Tetrachloride, ug/l	<2500	<5.0
Chlorobenzene, ug/l	<2500	<5.0
Chloroethane, ug/l	<5000	<10
2-Chloroethylvinyl Ether, ug/l	<25000	<50
Chloroform, ug/l	<2500	<5.0
Chloromethane, ug/l	<5000	<10
Dibromochloromethane, ug/l	<2500	<5.0
1,2-Dichlorobenzene, ug/l	<2500	<5.0
1,3-Dichlorobenzene, ug/l	<2500	<5.0
1,4-Dichlorobenzene, ug/l	<2500	<5.0
1,1-Dichloroethane, ug/l	<2500	<5.0
1,2-Dichloroethane, ug/l	<2500	<5.0
1,1-Dichloroethene, ug/l	<2500	<5.0
Trans-1,2-Dichloroethene, ug/l	<2500	<5.0
1,2-Dichloropropane, ug/l	<2500	<5.0
Cis-1,3-Dichloropropene, ug/l	<2500	<5.0
Trans-1,3-Dichloropropene, ug/l	<2500	<5.0
Ethylbenzene, ug/l	<2500	<5.0

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Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-6	RT-003	05-28-92
42584-7	Field Blank	05-28-92

PARAMETER	42584-6	42584-7
Methylene Chloride, ug/l	<2500	<5.0
1,1,2,2-Tetrachloroethane, ug/l	<2500	<5.0
Tetrachloroethene, ug/l	<2500	<5.0
Toluene, ug/l	<2500	<5.0
1,1,1-Trichloroethane, ug/l	<2500	<5.0
1,1,2-Trichloroethane, ug/l	<2500	<5.0
Trichloroethene, ug/l	52000	<5.0
Trichlorofluoromethane, ug/l	<2500	<5.0
Vinyl Chloride, ug/l	<5000	<10
Cis-1,2-Dichloroethene, ug/l	4000	<5.0
Surrogate - Toluene-d8	89 %	92 %
Surrogate - 4-Bromofluorobenzene	101 %	104 %
Surrogate - 1,2-Dichloroethane-d4	95 %	109 %
Date Analyzed	06.04.92	06.04.92
Fluoride (340.2)		
Fluoride (340.2), mg/l	0.40	<0.20
Date Analyzed	06.12.92	06.12.92

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5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-42584

Received: 30 MAY 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-8	Trip Blank	05-28-92

PARAMETER	42584-8
Purgeables (624)	
Benzene, ug/l	<5.0
Bromodichloromethane, ug/l	<5.0
Bromoform, ug/l	<5.0
Bromomethane, ug/l	<10
Carbon Tetrachloride, ug/l	<5.0
Chlorobenzene, ug/l	<5.0
Chloroethane, ug/l	<10
2-Chloroethylvinyl Ether, ug/l	<50
Chloroform, ug/l	<5.0
Chloromethane, ug/l	<10
Dibromochloromethane, ug/l	<5.0
1,2-Dichlorobenzene, ug/l	<5.0
1,3-Dichlorobenzene, ug/l	<5.0
1,4-Dichlorobenzene, ug/l	<5.0
1,1-Dichloroethane, ug/l	<5.0
1,2-Dichloroethane, ug/l	<5.0
1,1-Dichloroethene, ug/l	<5.0
Trans-1,2-Dichloroethene, ug/l	<5.0
1,2-Dichloropropane, ug/l	<5.0
Cis-1,3-Dichloropropene, ug/l	<5.0
Trans-1,3-Dichloropropene, ug/l	<5.0
Ethylbenzene, ug/l	<5.0
Methylene Chloride, ug/l	<5.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
42584-8	Trip Blank	05-28-92

PARAMETER	42584-8
1,1,2,2-Tetrachloroethane, ug/l	<5.0
Tetrachloroethene, ug/l	<5.0
Toluene, ug/l	<5.0
1,1,1-Trichloroethane, ug/l	<5.0
1,1,2-Trichloroethane, ug/l	<5.0
Trichloroethene, ug/l	<5.0
Trichlorofluoromethane, ug/l	<5.0
Vinyl Chloride, ug/l	<10
Cis-1,2-Dichloroethene, ug/l	<5.0
Surrogate - Toluene-d8	88 %
Surrogate - 4-Bromofluorobenzene	108 %
Surrogate - 1,2-Dichloroethane-d4	109 %
Date Analyzed	06.04.92

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Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-9	Detection Limits - Liquid
42584-10	Method Blank Result
42584-11	Lab Control Standard (LCS) Result
42584-12	LCS Expected Value
42584-13	LCS % Recovery

PARAMETER	42584-9	42584-10	42584-11	42584-12	42584-13
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	1.0	<1.0	1388	1415	98 %
Date Analyzed	---	06.01.92	06.01.92	---	---
Arsenic (7060)					
Arsenic, mg/l	0.010	<0.010	0.045	0.050	90 %
Date Analyzed	---	06.04.92	06.04.92	---	---
Barium (6010)					
Barium, mg/l	0.010	<0.010	0.972	1.00	97 %
Date Analyzed	---	06.12.92	06.12.92	---	---
Cadmium (6010)					
Cadmium, mg/l	0.0050	<0.0050	0.870	1.00	87 %
Date Analyzed	---	06.12.92	06.12.92	---	---
Chromium (6010)					
Chromium, mg/l	0.010	<0.010	0.937	1.00	94 %
Date Analyzed	---	06.12.92	06.12.92	---	---
Iron (6010)					
Iron, mg/l	0.050	<0.050	0.870	1.00	87 %
Date Analyzed	---	06.12.92	06.12.92	---	---
Lead (7421)					
Lead, mg/l	0.0050	<0.0050	0.051	0.050	102 %
Date Analyzed	---	06.11.92	06.11.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-9	Detection Limits - Liquid
42584-10	Method Blank Result
42584-11	Lab Control Standard (LCS) Result
42584-12	LCS Expected Value
42584-13	LCS % Recovery

PARAMETER	42584-9	42584-10	42584-11	42584-12	42584-13
Manganese (6010)					
Manganese, mg/l	0.010	<0.010	0.928	1.00	93 %
Date Analyzed	---	06.12.92	06.12.92	---	---
Mercury (7470)					
Mercury, mg/l	0.00020	<0.00020	0.00355	0.00350	101 %
Date Analyzed	---	06.02.92	06.02.92	---	---
Selenium (7740)					
Selenium, mg/l	0.010	<0.010	0.042	0.050	84 %
Date Analyzed	---	06.04.92	06.04.92	---	---
Silver (6010)					
Silver, mg/l	0.010	<0.010	0.906	1.01	90 %
Date Analyzed	---	06.12.92	06.12.92	---	---
Sodium (6010)					
Sodium , mg/l	0.50	<0.50	0.870	0.998	87 %
Date Analyzed	---	06.12.92	06.12.92	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	1.0	<1.0	7.94	7.7	103 %
Date Analyzed	---	06.15.92	06.15.92	---	---
Nitrate-N					
Nitrate-N (353.2), mg/l	0.050	<0.050	0.378	0.383	99 %
Date Analyzed	---	06.01.92	06.01.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-9	Detection Limits - Liquid
42584-10	Method Blank Result
42584-11	Lab Control Standard (LCS) Result
42584-12	LCS Expected Value
42584-13	LCS % Recovery

PARAMETER	42584-9	42584-10	42584-11	42584-12	42584-13
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	5.0	<5.0	138	138	100 %
Date Analyzed	---	06.10.92	06.10.92	---	---
Total Organic Carbon					
Total Organic Carbon , mg/l	1.0	<1.0	43.7	43.0	102 %
Date Analyzed	---	06.03.92	06.03.92	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	0.010	<0.010	0.088	0.100	88 %
Date Analyzed	---	06.08.92	06.08.92	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	0.010	<0.010	0.128	0.134	96 %
Date Analyzed	---	06.15.92	06.15.92	---	---

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42584-9	Detection Limits - Liquid
42584-10	Method Blank Result
42584-11	Lab Control Standard (LCS) Result
42584-12	LCS Expected Value
42584-13	LCS % Recovery

PARAMETER	42584-9	42584-10	42584-11	42584-12	42584-13
Purgeables (624)					
Benzene, ug/l	5.0	<5.0	51.7	50	103 %
Bromodichloromethane, ug/l	5.0	<5.0	---	---	---
Bromoform, ug/l	5.0	<5.0	---	---	---
Bromomethane, ug/l	10	<10	---	---	---
Carbon Tetrachloride, ug/l	5.0	<5.0	---	---	---
Chlorobenzene, ug/l	5.0	<5.0	50.6	50	101 %
Chloroethane, ug/l	10	<10	---	---	---
2-Chloroethylvinyl Ether, ug/l	50	<50	---	---	---
Chloroform, ug/l	5.0	<5.0	---	---	---
Chloromethane, ug/l	10	<10	---	---	---
Dibromochloromethane, ug/l	5.0	<5.0	---	---	---
1,2-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,3-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,4-Dichlorobenzene, ug/l	5.0	<5.0	---	---	---
1,1-Dichloroethane, ug/l	5.0	<5.0	---	---	---
1,2-Dichloroethane, ug/l	5.0	<5.0	---	---	---
1,1-Dichloroethene, ug/l	5.0	<5.0	43.4	50	87 %
Trans-1,2-Dichloroethene, ug/l	5.0	<5.0	---	---	---
1,2-Dichloropropane, ug/l	5.0	<5.0	---	---	---

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42584-9	Detection Limits - Liquid
42584-10	Method Blank Result
42584-11	Lab Control Standard (LCS) Result
42584-12	LCS Expected Value
42584-13	LCS % Recovery

PARAMETER	42584-9	42584-10	42584-11	42584-12	42584-13
Cis-1,3-Dichloropropene, ug/l	5.0	<5.0	---	---	---
Trans-1,3-Dichloropropene, ug/l	5.0	<5.0	---	---	---
Ethylbenzene, ug/l	5.0	<5.0	---	---	---
Methylene Chloride, ug/l	5.0	<5.0	---	---	---
1,1,2,2-Tetrachloroethane, ug/l	5.0	<5.0	---	---	---
Tetrachloroethene, ug/l	5.0	<5.0	---	---	---
Toluene, ug/l	5.0	<5.0	47.2	50	95 %
1,1,1-Trichloroethane, ug/l	5.0	<5.0	---	---	---
1,1,2-Trichloroethane, ug/l	5.0	<5.0	---	---	---
Trichloroethene, ug/l	5.0	<5.0	59.3	50	119 %
Trichlorofluoromethane, ug/l	5.0	<5.0	---	---	---
Vinyl Chloride, ug/l	10	<10	---	---	---
Cis-1,2-Dichloroethene, ug/l	5.0	<5.0	---	---	---
Surrogate - Toluene-d8	---	91 %	92 %	---	---
Surrogate - 4-Bromofluorobenzene	---	101 %	108 %	---	---
Surrogate - 1,2-Dichloroethane-d4	---	100 %	112 %	---	---
Date Analyzed	---	06.04.92	06.04.92	---	---
Fluoride (340.2)					
Fluoride (340.2), mg/l	0.20	<0.20	2.09	2.16	97 %
Date Analyzed	---	06.12.92	06.12.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-14	LCS % Recovery Limits
42584-15	Matrix Spike (MS) Result/Duplicate
42584-16	MS % Expected Value
42584-17	MS % Recovery/Duplicate
42584-18	MS % Recovery Limits

PARAMETER	42584-14	42584-15	42584-16	42584-17	42584-18
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	90-110 %	---	---	---	---
Arsenic (7060)					
Arsenic, mg/l	80-120 %	.045/.047	0.050	90/94 %	75-125 %
Date Analyzed	---	06.04.92	---	---	---
Barium (6010)					
Barium, mg/l	80-120 %	.972/.968	1.00	97/97 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---
Cadmium (6010)					
Cadmium, mg/l	80-120 %	.870/.872	1.00	87/87 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---
Chromium (6010)					
Chromium, mg/l	80-120 %	.937/.947	1.00	94/95 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---
Iron (6010)					
Iron, mg/l	80-120 %	.870/.872	1.00	87/87 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---
Lead (7421)					
Lead, mg/l	80-120 %	.051/.049	0.050	102/98 %	75-125 %
Date Analyzed	---	06.11.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-14	LCS % Recovery Limits
42584-15	Matrix Spike (MS) Result/Duplicate
42584-16	MS % Expected Value
42584-17	MS % Recovery/Duplicate
42584-18	MS % Recovery Limits

PARAMETER	42584-14	42584-15	42584-16	42584-17	42584-18
Manganese (6010)					
Manganese, mg/l	80-120 %	.928/.937	1.00	93/94 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---
Mercury (7470)					
Mercury, mg/l	80-120 %	0.000975/*	0.00100	98/98 %	75-125 %
Date Analyzed	---	06.02.92	---	---	---
Selenium (7740)					
Selenium, mg/l	80-120 %	.042/.043	0.050	84/86 %	75-125 %
Date Analyzed	---	06.04.92	---	---	---
Silver (6010)					
Silver, mg/l	80-120 %	.906/.867	1.01	90/86 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---
Sodium (6010)					
Sodium , mg/l	80-120 %	.870/.865	0.998	87/87 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	85-115 %	4.77/4.85	5.0	95/97 %	85-115 %
Date Analyzed	---	06.15.92	---	---	---
Nitrate-N					
Nitrate-N (353.2), mg/l	85-115 %	.171/.180	0.20	86/90 %	75-125 %
Date Analyzed	---	06.01.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-14	LCS % Recovery Limits
42584-15	Matrix Spike (MS) Result/Duplicate
42584-16	MS % Expected Value
42584-17	MS % Recovery/Duplicate
42584-18	MS % Recovery Limits

PARAMETER	42584-14	42584-15	42584-16	42584-17	42584-18
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	80-120 %	160/140	130	123/108 %	75-125 %
Date Analyzed	---	06.10.92	---	---	---
Total Organic Carbon					
Total Organic Carbon , mg/l	60-140 %	115/111	100	115/111 %	60-140 %
Date Analyzed	---	06.03.92	---	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	60-140 %	.083/.073	0.100	83/73 %	60-140 %
Date Analyzed	---	06.09.92	---	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	75-125 %	.205/.202	0.200	103/101 %	75-125 %
Date Analyzed	---	06.15.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-14	LCS % Recovery Limits
42584-15	Matrix Spike (MS) Result/Duplicate
42584-16	MS % Expected Value
42584-17	MS % Recovery/Duplicate
42584-18	MS % Recovery Limits

PARAMETER	42584-14	42584-15	42584-16	42584-17	42584-18
Purgeables (624)					
Benzene, ug/l	73-144 %	58.4/62.4	50	117/125 %	73-144 %
Chlorobenzene, ug/l	68-136 %	60.6/58.4	50	121/117 %	68-136 %
1,1-Dichloroethene, ug/l	60-136 %	50.4/54.0	50	101/108 %	60-136 %
Toluene, ug/l	68-138 %	56.8/54.6	50	114/109 %	68-138 %
Trichloroethene, ug/l	66-136 %	72.4/71.4	50	145/143 %	66-136 %
Surrogate - Toluene-d8	---	87/86 %	---	---	---
Surrogate - 4-Bromofluorobenzene	---	106/106 %	---	---	---
Surrogate - 1,2-Dichloroethane-d4	---	110/108 %	---	---	---
Date Analyzed	---	06.03.92	---	---	---
Fluoride (340.2)					
Fluoride (340.2), mg/l	85-115 %	1.99/2.07	2.0	99/104 %	75-125 %
Date Analyzed	---	06.12.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES	
42584-19	MS % RPD (Limit)	
PARAMETER	42584-19	
Specific Conductance (120.1)		
Specific Conductance	---	
Arsenic (7060)		
Arsenic	3.2(<20) %	
Barium (6010)		
Barium	0(<20) %	
Cadmium (6010)		
Cadmium	0(<20) %	
Chromium (6010)		
Chromium	1.1(<20) %	
Iron (6010)		
Iron	0(<20) %	
Lead (7421)		
Lead	4(<20) %	
Manganese (6010)		
Manganese	1.1(<20) %	
Mercury (7470)		
Mercury	0(<20) %	
Selenium (7740)		
Selenium	1.2(<20) %	
Silver (6010)		
Silver	4.5(<20) %	
Sodium (6010)		
Sodium	0(<20) %	
Chloride (325.2)		
Chloride (325.2)	2.1(<30) %	

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

42584-19 MS % RPD (Limit)

PARAMETER	42584-19
Nitrate-N	
Nitrate-N (353.2)	5.1(<30) %
Sulfate as SO4 (9035)	
Sulfate as SO4 (375.2), mg/l	13(<30) %
Total Organic Carbon	
Total Organic Carbon	2.8(<40) %
Total Organic Halogen	
Total Organic Halogen	13(<40) %
Phenolics, Total Recoverable (9065)	
Phenolics,Total Recoverable	2.0(<30) %
Purgeables (624)	
Benzene, ug/l	6.6(<22) %
Chlorobenzene, ug/l	3.4(<17) %
1,1-Dichloroethene, ug/l	6.7(<19) %
Toluene, ug/l	4.5(<17) %
Trichloroethene, ug/l	1.4(<20) %
Fluoride (340.2)	
Fluoride (340.2), mg/l	5.0(<30) %

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LOG NO: S2-42584

Received: 30 MAY 92

Mr. Sam Moyers
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/Randall Textron/TO#6562
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-20	ICVS/CCVS Control Limits
42584-21	ICVS/CCVS Source Lot
42584-22	ICVS/CCVS Expected Value
42584-23	ICVS Result
42584-24	ICVS % Recovery

PARAMETER	42584-20	42584-21	42584-22	42584-23	42584-24
Arsenic (7060)					
Arsenic, mg/l	90-110 %	SPEX	0.050	0.052	104 %
Date Analyzed	---	---	---	06.04.92	---
Barium (6010)					
Barium, mg/l	90-110 %	3-128AS	1.00	1.02	102 %
Date Analyzed	---	---	---	06.12.92	---
Cadmium (6010)					
Cadmium, mg/l	90-110 %	3-159AS	1.00	1.05	105 %
Date Analyzed	---	---	---	06.12.92	---
Chromium (6010)					
Chromium, mg/l	90-110 %	3-159AS	1.00	1.06	106 %
Date Analyzed	---	---	---	06.12.92	---
Iron (6010)					
Iron, mg/l	90-110 %	3-159AS	1.00	0.956	96 %
Date Analyzed	---	---	---	06.12.92	---
Lead (7421)					
Lead, mg/l	90-110 %	SPEX	0.050	0.047	94 %
Date Analyzed	---	---	---	06.11.92	---
Manganese (6010)					
Manganese, mg/l	90-110 %	3-159AS	1.00	1.05	105 %
Date Analyzed	---	---	---	06.12.92	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
42584-20	ICVS/CCVS Control Limits
42584-21	ICVS/CCVS Source Lot
42584-22	ICVS/CCVS Expected Value
42584-23	ICVS Result
42584-24	ICVS % Recovery

PARAMETER	42584-20	42584-21	42584-22	42584-23	42584-24
Mercury (7470)					
Mercury, mg/l	80-120 %	EPA 475-5	0.00350	0.00355	101 %
Date Analyzed	---	---	---	06.02.92	---
Selenium (7740)					
Selenium, mg/l	90-110 %	SPEX	0.050	0.048	96 %
Date Analyzed	---	---	---	06.04.92	---
Silver (6010)					
Silver, mg/l	90-110 %	3-128AS	1.01	1.03	102 %
Date Analyzed	---	---	---	06.12.92	---
Sodium (6010)					
Sodium , mg/l	90-110 %	3-128AS	0.998	1.07	107 %
Date Analyzed	---	---	---	06.12.92	---

Methods: EPA SW-846.

MS Dup Result for Mercury * = 0.00982 mg/l
*F65 = Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

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Sampled By: Client

REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

42584-25 CCVS Result
42584-26 CCVS % Recovery

PARAMETER	42584-25	42584-26
Arsenic (7060)		
Arsenic, mg/l	0.049	98 %
Date Analyzed	06.04.92	---
Barium (6010)		
Barium, mg/l	0.993	99 %
Date Analyzed	06.12.92	---
Cadmium (6010)		
Cadmium, mg/l	0.997	99 %
Date Analyzed	06.12.92	---
Chromium (6010)		
Chromium, mg/l	0.997	100 %
Date Analyzed	06.12.92	---
Iron (6010)		
Iron, mg/l	0.997	100 %
Date Analyzed	06.12.92	---
Lead (7421)		
Lead, mg/l	0.057	114 %
Date Analyzed	06.11.92	---
Manganese (6010)		
Manganese, mg/l	0.988	99 %
Date Analyzed	06.12.92	---
Mercury (7470)		
Mercury, mg/l	0.00367	105 %
Date Analyzed	06.02.92	---

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Project: TN20001/Randall Textron/TO#6562
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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

42584-25 CCVS Result
42584-26 CCVS % Recovery

PARAMETER	42584-25	42584-26
Selenium (7740)		
Selenium, mg/l	0.048	96 %
Date Analyzed	06.04.92	---
Silver (6010)		
Silver, mg/l	1.02	101 %
Date Analyzed	06.12.92	---
Sodium (6010)		
Sodium , mg/l	0.983	99 %
Date Analyzed	06.12.92	---

Methods: EPA SW-846.

MS Dup Result for Mercury * = 0.00982 mg/l
*F65 = Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

Janette D. Long

Janette D. Long

APPENDIX C-4

JUNE 1992 RESULTS

SL *SAVANNAH LABORATORIES*
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5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-43231

Received: 03 JUL 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/LTO #06567
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-1	RT-1	06-30-92
43231-2	RT-2	06-30-92
43231-3	RT-3	06-30-92
43231-4	RT-4	06-30-92
43231-5	RT-5	06-30-92

PARAMETER	43231-1	43231-2	43231-3	43231-4	43231-5
pH (150.1)					
pH (150.1), units	5.9	6.2	6.3	7.0	6.8
Date Analyzed	07.03.92	07.03.92	07.03.92	07.03.92	07.03.92
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	680	700	840	690	670
Date Analyzed	07.06.92	07.06.92	07.06.92	07.06.92	07.06.92
Arsenic (7060)					
Arsenic, mg/l	<0.010	<0.010	<0.010	<0.050*F65	0.011
Date Analyzed	07.08.92	07.08.92	07.08.92	07.14.92	07.09.92
Barium (6010)					
Barium, mg/l	0.067	0.086	0.072	0.17	0.15
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Cadmium (6010)					
Cadmium, mg/l	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Chromium (6010)					
Chromium, mg/l	0.014	55	81	0.021	0.016
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Iron (6010)					
Iron, mg/l	5.1	4.3	2.4	12	13
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92

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Project: TN20001/LTO #06567
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-1	RT-1	06-30-92
43231-2	RT-2	06-30-92
43231-3	RT-3	06-30-92
43231-4	RT-4	06-30-92
43231-5	RT-5	06-30-92

PARAMETER	43231-1	43231-2	43231-3	43231-4	43231-5
Lead (7421)					
Lead , mg/l	<0.0050	<0.0050	<0.0050	0.0073	0.0062
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Manganese (6010)					
Manganese, mg/l	0.71	0.53	0.35	1.5	3.0
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Mercury (7470)					
Mercury, mg/l	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Date Analyzed	07.07.92	07.07.92	07.07.92	07.07.92	07.07.92
Selenium (7740)					
Selenium, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Silver (6010)					
Silver, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Sodium (6010)					
Sodium , mg/l	100	85	110	120	90
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92
Chloride (325.2)					
Chloride (325.2), mg/l	110	63	82	60	56
Date Analyzed	07.08.92	07.08.92	07.08.92	07.08.92	07.08.92

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-1	RT-1	06-30-92
43231-2	RT-2	06-30-92
43231-3	RT-3	06-30-92
43231-4	RT-4	06-30-92
43231-5	RT-5	06-30-92

PARAMETER	43231-1	43231-2	43231-3	43231-4	43231-5
Nitrate-N					
Nitrate-N (353.2), mg/l	0.19	<0.050	<0.050	<0.050	<0.050
Date Analyzed	07.03.92	07.03.92	07.03.92	07.03.92	07.03.92
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	96	90	110	110	120
Date Analyzed	07.22.92	07.22.92	07.22.92	07.22.92	07.22.92
Total Organic Carbon					
Total Organic Carbon , mg/l	5.1	8.1	24	5.1	3.6
Date Analyzed	07.07.92	07.07.92	07.07.92	07.07.92	07.07.92
Total Organic Halogen					
Total Organic Halogen, mg/l	0.11	58	40	2.5	4.5
Date Analyzed	07.16.92	07.16.92	07.16.92	07.16.92	07.16.92
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	<0.010	<0.010	<0.010	<0.010	<0.010
Date Analyzed	07.14.92	07.14.92	07.14.92	07.14.92	07.14.92

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Revision 1
Received: 03 JUL 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/LTO #06567
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-1	RT-1	06-30-92
43231-2	RT-2	06-30-92
43231-3	RT-3	06-30-92
43231-4	RT-4	06-30-92
43231-5	RT-5	06-30-92

PARAMETER	43231-1	43231-2	43231-3	43231-4	43231-5
Purgeables (624)					
Benzene, ug/l	<5.0	<5000	<5000	<250	<250
Bromodichloromethane, ug/l	<5.0	<5000	<5000	<250	<250
Bromoform, ug/l	<5.0	<5000	<5000	<250	<250
Bromomethane, ug/l	<10	<10000	<10000	<500	<500
Carbon Tetrachloride, ug/l	<5.0	<5000	<5000	<250	<250
Chlorobenzene, ug/l	<5.0	<5000	<5000	<250	<250
Chloroethane, ug/l	<10	<10000	<10000	<500	<500
2-Chloroethylvinyl Ether, ug/l	<50	<50000	<50000	<2500	<2500
Chloroform, ug/l	<5.0	<5000	<5000	<250	<250
Chloromethane, ug/l	<10	<10000	<10000	<500	<500
Dibromochloromethane, ug/l	<5.0	<5000	<5000	<250	<250
1,2-Dichlorobenzene, ug/l	<5.0	<5000	<5000	<250	<250
1,3-Dichlorobenzene, ug/l	<5.0	<5000	<5000	<250	<250
1,4-Dichlorobenzene, ug/l	<5.0	<5000	<5000	<250	<250
1,1-Dichloroethane, ug/l	<5.0	<5000	<5000	<250	<250
1,2-Dichloroethane, ug/l	<5.0	<5000	<5000	<250	<250
1,1-Dichloroethene, ug/l	<5.0	<5000	<5000	<250	<250
Trans-1,2-Dichloroethene, ug/l	<5.0	<5000	<5000	<250	<250
1,2-Dichloropropane, ug/l	<5.0	<5000	<5000	<250	<250

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-1	RT-1	06-30-92
43231-2	RT-2	06-30-92
43231-3	RT-3	06-30-92
43231-4	RT-4	06-30-92
43231-5	RT-5	06-30-92

PARAMETER	43231-1	43231-2	43231-3	43231-4	43231-5
Cis-1,3-Dichloropropene, ug/l	<5.0	<5000	<5000	<250	<250
Trans-1,3-Dichloropropene, ug/l	<5.0	<5000	<5000	<250	<250
Ethylbenzene, ug/l	<5.0	<5000	<5000	<250	<250
Methylene Chloride, ug/l	<5.0	<5000	<5000	<250	<250
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<5000	<5000	<250	<250
Tetrachloroethene, ug/l	<5.0	<5000	<5000	<250	<250
Toluene, ug/l	<5.0	<5000	<5000	<250	<250
1,1,1-Trichloroethane, ug/l	<5.0	<5000	<5000	<250	<250
1,1,2-Trichloroethane, ug/l	<5.0	<5000	<5000	<250	<250
Trichloroethene, ug/l	130	73000	52000	650	4900
Trichlorofluoromethane, ug/l	<5.0	<5000	<5000	<250	<250
Vinyl Chloride, ug/l	<10	<10000	<10000	860	<500
Cis-1,2-Dichloroethene, ug/l	5.8	<5000	<5000	4600	3000
Surrogate - Toluene-d8	104 %	99 %	100 %	104 %	104 %
Surrogate - 4-Bromofluorobenzene	106 %	110 %	109 %	108 %	106 %
Surrogate - 1,2-Dichloroethane-d4	81 %	82 %	81 %	82 %	84 %
Date Analyzed	07.10.92	07.10.92	07.10.92	07.10.92	07.10.92
Fluoride (340.2)					
Fluoride (340.2), mg/l	<0.20	<0.20	0.47	0.23	<0.20
Date Analyzed	07.17.92	07.17.92	07.17.92	07.17.92	07.17.92

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Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-6	Field Blank	06-30-92
43231-7	RT-002	06-30-92

PARAMETER	43231-6	43231-7
pH (150.1)		
pH (150.1), units	6.2	6.4
Date Analyzed	07.03.92	07.03.92
Specific Conductance (120.1)		
Specific Conductance, umhos/cm	2.1	700
Date Analyzed	07.06.92	07.06.92
Arsenic (7060)		
Arsenic, mg/l	<0.010	<0.010
Date Analyzed	07.09.92	07.09.92
Barium (6010)		
Barium, mg/l	<0.010	0.11
Date Analyzed	07.08.92	07.08.92
Cadmium (6010)		
Cadmium, mg/l	<0.0050	<0.0050
Date Analyzed	07.08.92	07.08.92
Chromium (6010)		
Chromium, mg/l	<0.010	52
Date Analyzed	07.08.92	07.08.92
Iron (6010)		
Iron, mg/l	<0.050	9.9
Date Analyzed	07.08.92	07.08.92
Lead (7421)		
Lead , mg/l	<0.0050	0.0086
Date Analyzed	07.08.92	07.08.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-6	Field Blank	06-30-92
43231-7	RT-002	06-30-92

PARAMETER	43231-6	43231-7
Manganese (6010)		
Manganese, mg/l	<0.010	0.78
Date Analyzed	07.08.92	07.08.92
Mercury (7470)		
Mercury, mg/l	0.00045	<0.00020
Date Analyzed	07.07.92	07.07.92
Selenium (7740)		
Selenium, mg/l	<0.010	<0.010
Date Analyzed	07.08.92	07.08.92
Silver (6010)		
Silver, mg/l	<0.010	<0.010
Date Analyzed	07.08.92	07.08.92
Sodium (6010)		
Sodium , mg/l	<0.50	82
Date Analyzed	07.08.92	07.08.92
Chloride (325.2)		
Chloride (325.2), mg/l	<1.0	64
Date Analyzed	07.08.92	07.08.92
Nitrate-N		
Nitrate-N (353.2), mg/l	<0.050	<0.050
Date Analyzed	07.03.92	07.03.92
Sulfate as SO4 (9035)		
Sulfate as SO4 (375.2), mg/l	<5.0	85
Date Analyzed	07.22.92	07.22.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-6	Field Blank	06-30-92
43231-7	RT-002	06-30-92

PARAMETER	43231-6	43231-7
Total Organic Carbon		
Total Organic Carbon , mg/l	1.7	8.5
Date Analyzed	07.07.92	07.07.92
Total Organic Halogen		
Total Organic Halogen, mg/l	0.027	55
Date Analyzed	07.16.92	07.16.92
Phenolics, Total Recoverable (9065)		
Phenolics,Total Recoverable, mg/l	<0.010	<0.010
Date Analyzed	07.14.92	07.14.92

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Oak Ridge, Tennessee 37830

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-6	Field Blank	06-30-92
43231-7	RT-002	06-30-92

PARAMETER	43231-6	43231-7
Purgeables (624)		
Benzene, ug/l	<5.0	<5000
Bromodichloromethane, ug/l	<5.0	<5000
Bromoform, ug/l	<5.0	<5000
Bromomethane, ug/l	<10	<10000
Carbon Tetrachloride, ug/l	<5.0	<5000
Chlorobenzene, ug/l	<5.0	<5000
Chloroethane, ug/l	<10	<10000
2-Chloroethylvinyl Ether, ug/l	<50	<50000
Chloroform, ug/l	<5.0	<5000
Chloromethane, ug/l	<10	<10000
Dibromochloromethane, ug/l	<5.0	<5000
1,2-Dichlorobenzene, ug/l	<5.0	<5000
1,3-Dichlorobenzene, ug/l	<5.0	<5000
1,4-Dichlorobenzene, ug/l	<5.0	<5000
1,1-Dichloroethane, ug/l	<5.0	<5000
1,2-Dichloroethane, ug/l	<5.0	<5000
1,1-Dichloroethene, ug/l	<5.0	<5000
Trans-1,2-Dichloroethene, ug/l	<5.0	<5000
1,2-Dichloropropane, ug/l	<5.0	<5000
Cis-1,3-Dichloropropene, ug/l	<5.0	<5000
Trans-1,3-Dichloropropene, ug/l	<5.0	<5000
Ethylbenzene, ug/l	<5.0	<5000

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LOG NO: S2-43231
Revision 1
Received: 03 JUL 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/LTO #06567
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	DATE SAMPLED
43231-6	Field Blank	06-30-92
43231-7	RT-002	06-30-92

PARAMETER	43231-6	43231-7
Methylene Chloride, ug/l	<5.0	<5000
1,1,2,2-Tetrachloroethane, ug/l	<5.0	<5000
Tetrachloroethene, ug/l	<5.0	<5000
Toluene, ug/l	<5.0	<5000
1,1,1-Trichloroethane, ug/l	<5.0	<5000
1,1,2-Trichloroethane, ug/l	<5.0	<5000
Trichloroethene, ug/l	<5.0	78000
Trichlorofluoromethane, ug/l	<5.0	<5000
Vinyl Chloride, ug/l	<10	<10000
Cis-1,2-Dichloroethene, ug/l	<5.0	<5000
Surrogate - Toluene-d8	114 %	101 %
Surrogate - 4-Bromofluorobenzene	122 %	108 %
Surrogate - 1,2-Dichloroethane-d4	88 %	81 %
Date Analyzed	07.10.92	07.10.92
Fluoride (340.2)		
Fluoride (340.2), mg/l	<0.20	<0.20
Date Analyzed	07.17.92	07.17.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES
43231-8	Trip Blank

PARAMETER	43231-8
Purgeables (624)	
Benzene, ug/l	<5.0
Bromodichloromethane, ug/l	<5.0
Bromoform, ug/l	<5.0
Bromomethane, ug/l	<10
Carbon Tetrachloride, ug/l	<5.0
Chlorobenzene, ug/l	<5.0
Chloroethane, ug/l	<10
2-Chloroethylvinyl Ether, ug/l	<50
Chloroform, ug/l	<5.0
Chloromethane, ug/l	<10
Dibromochloromethane, ug/l	<5.0
1,2-Dichlorobenzene, ug/l	<5.0
1,3-Dichlorobenzene, ug/l	<5.0
1,4-Dichlorobenzene, ug/l	<5.0
1,1-Dichloroethane, ug/l	<5.0
1,2-Dichloroethane, ug/l	<5.0
1,1-Dichloroethene, ug/l	<5.0
Trans-1,2-Dichloroethene, ug/l	<5.0
1,2-Dichloropropane, ug/l	<5.0
Cis-1,3-Dichloropropene, ug/l	<5.0
Trans-1,3-Dichloropropene, ug/l	<5.0
Ethylbenzene, ug/l	<5.0
Methylene Chloride, ug/l	<5.0

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES
43231-8	Trip Blank

PARAMETER	43231-8
1,1,2,2-Tetrachloroethane, ug/l	<5.0
Tetrachloroethene, ug/l	<5.0
Toluene, ug/l	<5.0
1,1,1-Trichloroethane, ug/l	<5.0
1,1,2-Trichloroethane, ug/l	<5.0
Trichloroethene, ug/l	<5.0
Trichlorofluoromethane, ug/l	<5.0
Vinyl Chloride, ug/l	<10
Cis-1,2-Dichloroethene, ug/l	<5.0
Surrogate - Toluene-d8	112 %
Surrogate - 4-Bromofluorobenzene	123 %
Surrogate - 1,2-Dichloroethane-d4	88 %
Date Analyzed	07.10.92

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-9	Detection Limits
43231-10	Method Blank Result
43231-11	Lab Control Sample (LCS) Result
43231-12	LCS Expected Value
43231-13	LCS % Recovery

PARAMETER	43231-9	43231-10	43231-11	43231-12	43231-13
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	1.0	<1.0	1373	1394.5	98 %
Date Analyzed	---	07.06.92	07.06.92	---	---
Arsenic (7060)					
Arsenic, mg/l	0.010	<0.010	0.045	0.050	90 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Barium (6010)					
Barium, mg/l	0.010	<0.010	0.958	1.00	96 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Cadmium (6010)					
Cadmium, mg/l	0.0050	<0.0050	0.914	1.00	91 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Chromium (6010)					
Chromium, mg/l	0.010	<0.010	0.972	1.00	97 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Iron (6010)					
Iron, mg/l	0.050	<0.050	0.887	1.00	89 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Lead (7421)					
Lead , mg/l	0.0050	<0.0050	0.052	0.050	104 %
Date Analyzed	---	07.08.92	07.08.92	---	---

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-9	Detection Limits
43231-10	Method Blank Result
43231-11	Lab Control Sample (LCS) Result
43231-12	LCS Expected Value
43231-13	LCS % Recovery

PARAMETER	43231-9	43231-10	43231-11	43231-12	43231-13
Manganese (6010)					
Manganese, mg/l	0.010	<0.010	0.944	1.00	94 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Mercury (7470)					
Mercury, mg/l	0.00020	<0.00020	0.00374	0.00350	107 %
Date Analyzed	---	07.02.92	07.02.92	---	---
Selenium (7740)					
Selenium, mg/l	0.010	<0.010	0.045	0.050	90 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Silver (6010)					
Silver, mg/l	0.010	<0.010	0.853	1.01	85 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Sodium (6010)					
Sodium , mg/l	0.50	<0.50	0.972	0.998	97 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	1.0	<1.0	8.18	7.7	106 %
Date Analyzed	---	07.08.92	07.08.92	---	---
Nitrate-N					
Nitrate-N (353.2), mg/l	0.050	<0.050	0.354	0.383	92 %
Date Analyzed	---	07.03.92	07.03.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-9	Detection Limits
43231-10	Method Blank Result
43231-11	Lab Control Sample (LCS) Result
43231-12	LCS Expected Value
43231-13	LCS % Recovery

PARAMETER	43231-9	43231-10	43231-11	43231-12	43231-13
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	5.0	<5.0	23.0	27.6	83 %
Date Analyzed	---	07.22.92	07.22.92	---	---
Total Organic Carbon					
Total Organic Carbon , mg/l	1.0	<1.0	39.4	43.0	92 %
Date Analyzed	---	07.07.92	07.07.92	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	0.010	<0.010	0.166	0.191	87 %
Date Analyzed	---	07.16.92	07.16.92	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	0.010	<0.010	0.434	0.470	92 %
Date Analyzed	---	07.14.92	07.14.92	---	---

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43231-9	Detection Limits
43231-10	Method Blank Result
43231-11	Lab Control Sample (LCS) Result
43231-12	LCS Expected Value
43231-13	LCS % Recovery

PARAMETER	43231-9	43231-10	43231-11	43231-12	43231-13
Purgeables (624)					
Benzene, mg/l	5.0	<5.0	42	50	84 %
Bromodichloromethane, mg/l	5.0	<5.0	---	---	---
Bromoform, mg/l	5.0	<5.0	---	---	---
Bromomethane, mg/l	10	<10	---	---	---
Carbon Tetrachloride, mg/l	5.0	<5.0	---	---	---
Chlorobenzene, mg/l	5.0	<5.0	38	50	76 %
Chloroethane, mg/l	10	<10	---	---	---
2-Chloroethylvinyl Ether, mg/l	50	<50	---	---	---
Chloroform, mg/l	5.0	<5.0	---	---	---
Chloromethane, mg/l	10	<10	---	---	---
Dibromochloromethane, mg/l	5.0	<5.0	---	---	---
1,2-Dichlorobenzene, mg/l	5.0	<5.0	---	---	---
1,3-Dichlorobenzene, mg/l	5.0	<5.0	---	---	---
1,4-Dichlorobenzene, mg/l	5.0	<5.0	---	---	---
1,1-Dichloroethane, mg/l	5.0	<5.0	---	---	---
1,2-Dichloroethane, mg/l	5.0	<5.0	---	---	---
1,1-Dichloroethene, mg/l	5.0	<5.0	45	50	90 %
Trans-1,2-Dichloroethene, mg/l	5.0	<5.0	---	---	---
1,2-Dichloropropane, mg/l	5.0	<5.0	---	---	---

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

43231-9 Detection Limits
43231-10 Method Blank Result
43231-11 Lab Control Sample (LCS) Result
43231-12 LCS Expected Value
43231-13 LCS % Recovery

PARAMETER	43231-9	43231-10	43231-11	43231-12	43231-13
Cis-1,3-Dichloropropene, mg/l	5.0	<5.0	---	---	---
Trans-1,3-Dichloropropene, mg/l	5.0	<5.0	---	---	---
Ethylbenzene, mg/l	5.0	<5.0	---	---	---
Methylene Chloride, mg/l	5.0	<5.0	---	---	---
1,1,2,2-Tetrachloroethane, mg/l	5.0	<5.0	---	---	---
Tetrachloroethene, mg/l	5.0	<5.0	---	---	---
Toluene, mg/l	5.0	<5.0	43	50	86 %
1,1,1-Trichloroethane, mg/l	5.0	<5.0	---	---	---
1,1,2-Trichloroethane, mg/l	5.0	<5.0	---	---	---
Trichloroethene, mg/l	5.0	<5.0	37	50	74 %
Trichlorofluoromethane, mg/l	5.0	<5.0	---	---	---
Vinyl Chloride, mg/l	10	<10	---	---	---
Cis-1,2-Dichloroethene, ug/l	5.0	<5.0	---	---	---
Surrogate - Toluene-d8	---	111/100 %	113 %	---	---
Surrogate - 4-Bromofluorobenzene	---	121/109 %	122 %	---	---
Surrogate - 1,2-Dichloroethane-d4	---	88/80 %	88 %	---	---
Date Analyzed	---	07.10.92	07.10.92	---	---
Fluoride (340.2)					
Fluoride (340.2), mg/l	0.20	<0.20	2.17	2.16	101 %
Date Analyzed	---	07.17.92	07.17.92	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-14	LCS % Recovery Limits
43231-15	Matrix Spike (MS) Result/Duplicate
43231-16	MS Expected Value
43231-17	MS % Recovery/Duplicate
43231-18	MS % Recovery Limit

PARAMETER	43231-14	43231-15	43231-16	43231-17	43231-18
Specific Conductance (120.1)					
Specific Conductance, umhos/cm	90-110 %	---	---	---	---
Arsenic (7060)					
Arsenic, mg/l	80-120 %	49/48	0.050	98/96 %	75-125 %
Date Analyzed	---	07.14.92	---	---	---
Barium (6010)					
Barium, mg/l	80-120 %	.968/.966	1.00	97/97 %	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Cadmium (6010)					
Cadmium, mg/l	80-120 %	.919/.910	1.00	92/91 %	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Chromium (6010)					
Chromium, mg/l	80-120 %	.973/.960	1.00	97/96 %	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Iron (6010)					
Iron, mg/l	80-120 %	*F61	1.00	---	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Lead (7421)					
Lead , mg/l	80-120 %	.052/.051	0.050	104/102 %	75-125 %
Date Analyzed	---	07.08.92	---	---	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-14	LCS % Recovery Limits
43231-15	Matrix Spike (MS) Result/Duplicate
43231-16	MS Expected Value
43231-17	MS % Recovery/Duplicate
43231-18	MS % Recovery Limit

PARAMETER	43231-14	43231-15	43231-16	43231-17	43231-18
Manganese (6010)					
Manganese, mg/l	80-120 %	.815/.823	1.00	82/82 %	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Mercury (7470)					
Mercury, mg/l	80-120 %	0.00083/*	0.00100	107/104 %	75-125 %
Date Analyzed	---	07.07.92	---	---	---
Selenium (7740)					
Selenium, mg/l	80-120 %	.016/.015	0.050	32/30 %	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Silver (6010)					
Silver, mg/l	80-120 %	.931/.931	1.01	92/92 %	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Sodium (6010)					
Sodium , mg/l	80-120 %	*F61	0.998	--	75-125 %
Date Analyzed	---	07.08.92	---	---	---
Chloride (325.2)					
Chloride (325.2), mg/l	85-115 %	4.85/5.17	5.0	97/103 %	85-115 %
Date Analyzed	---	07.08.92	---	---	---
Nitrate-N					
Nitrate-N (353.2), mg/l	85-115 %	.182/.187	0.20	91/93 %	75-125 %
Date Analyzed	---	07.03.92	---	---	---

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-14	LCS % Recovery Limits
43231-15	Matrix Spike (MS) Result/Duplicate
43231-16	MS Expected Value
43231-17	MS % Recovery/Duplicate
43231-18	MS % Recovery Limit

PARAMETER	43231-14	43231-15	43231-16	43231-17	43231-18
Sulfate as SO4 (9035)					
Sulfate as SO4 (375.2), mg/l	80-120 %	19.4/20.0	20	97/100 %	75-125 %
Date Analyzed	---	07.22.92	---	---	---
Total Organic Carbon					
Total Organic Carbon , mg/l	60-140 %	97.3/102.2	100	90/94 %	60-140 %
Date Analyzed	---	07.07.92	---	---	---
Total Organic Halogen					
Total Organic Halogen, mg/l	60-140 %	.075/.078	0.100	75/78 %	60-140 %
Date Analyzed	---	07.16.92	---	---	---
Phenolics, Total Recoverable (9065)					
Phenolics,Total Recoverable, mg/l	75-125 %	.206/.205	0.200	98/98 %	75-125 %
Date Analyzed	---	07.14.92	---	---	---

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43231-14	LCS % Recovery Limits
43231-15	Matrix Spike (MS) Result/Duplicate
43231-16	MS Expected Value
43231-17	MS % Recovery/Duplicate
43231-18	MS % Recovery Limit

PARAMETER	43231-14	43231-15	43231-16	43231-17	43231-18
Purgeables (624)					
Benzene, ug/l	73-144 %	44.3/42.8	50	88/86 %	73-144 %
Chlorobenzene, ug/l	68-136 %	41.7/40.1	50	84/80 %	68-136 %
1,1-Dichloroethene, ug/l	60-136 %	53.5/50.1	50	107/100 %	60-136 %
Toluene, ug/l	68-138 %	45.3/42.9	50	91/86 %	68-138 %
Trichloroethene, ug/l	66-136 %	37.8/35.7	50	76/71 %	66-136 %
Surrogate - Toluene-d8	---	92/92 %	---	---	---
Surrogate - 4-Bromofluorobenzene	---	88/86 %	---	---	---
Surrogate - 1,2-Dichloroethane-d4	---	86/83 %	---	---	---
Date Analyzed	---	07.10.92	---	---	---
Fluoride (340.2)					
Fluoride (340.2), mg/l	75-125 %	1.14/1.09	1.0	114/109 %	75-125 %
Date Analyzed	---	07.17.92	---	---	---

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REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

43231-19 MS % RPD (Limit)

PARAMETER	43231-19
Arsenic (7060)	
Arsenic	2.1(<20)%
Barium (6010)	
Barium	0(<20)%
Cadmium (6010)	
Cadmium	1.1(<20)%
Chromium (6010)	
Chromium	1.0(<20)%
Iron (6010)	
Iron	(<20)%
Lead (7421)	
Lead	1.9(<25)%
Manganese (6010)	
Manganese	0(<20)%
Mercury (7470)	
Mercury	2.8(<20)%
Selenium (7740)	
Selenium	6.5(<20)%
Silver (6010)	
Silver	0(<20)%
Sodium (6010)	
Sodium	(<20)%
Chloride (325.2)	
Chloride (325.2)	6.0(<30)%
Nitrate-N	
Nitrate-N (353.2)	2.2(<30)%

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-19	MS % RPD (Limit)

PARAMETER	43231-19
Sulfate as SO4 (9035)	
Sulfate as SO4 (375.2)	3.0(<30)%
Total Organic Carbon	
Total Organic Carbon	4.3(<40)%
Total Organic Halogen	
Total Organic Halogen	3.9(<40)%
Phenolics, Total Recoverable (9065)	
Phenolics,Total Recoverable	0(<30)%
Purgeables (624)	
Benzene	2.3(<22)%
Chlorobenzene	4.9(<17)%
1,1-Dichloroethene	6.8(<40)%
Toluene	5.6(<17)%
Trichloroethene	6.8(<20)%
Fluoride (340.2)	
Fluoride (340.2)	4.5(<30)%

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5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S2-43231

Received: 03 JUL 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/LTO #06567
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-20	ICVS/CCVS Control Limits
43231-21	ICVS/CCVS Source Lot
43231-22	ICVS/CCVS Expected Value
43231-23	ICVS Result
43231-24	ICVS % Recovery

PARAMETER	43231-20	43231-21	43231-22	43231-23	43231-24
Arsenic (7060)					
Arsenic, mg/l	90-110 %	SPEX	0.050	0.054	108 %
Date Analyzed	---	---	---	07.08.92	---
Barium (6010)					
Barium, mg/l	90-110 %	3-159AS	1.00	0.989	99 %
Date Analyzed	---	---	---	07.08.92	---
Cadmium (6010)					
Cadmium, mg/l	90-110 %	3-159AS	1.00	1.00	100 %
Date Analyzed	---	---	---	07.08.92	---
Chromium (6010)					
Chromium, mg/l	90-110 %	3-159AS	1.00	1.02	102 %
Date Analyzed	---	---	---	07.08.92	---
Iron (6010)					
Iron, mg/l	90-110 %	3-159AS	1.00	0.924	92 %
Date Analyzed	---	---	---	07.08.92	---
Lead (7421)					
Lead , mg/l	90-110 %	SPEX	0.050	0.051	102 %
Date Analyzed	---	---	---	07.08.92	---
Manganese (6010)					
Manganese, mg/l	90-110 %	3-159AS	1.00	0.987	99 %
Date Analyzed	---	---	---	07.08.92	---

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REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-20	ICVS/CCVS Control Limits
43231-21	ICVS/CCVS Source Lot
43231-22	ICVS/CCVS Expected Value
43231-23	ICVS Result
43231-24	ICVS % Recovery

PARAMETER	43231-20	43231-21	43231-22	43231-23	43231-24
Mercury (7470)					
Mercury, mg/l	80-120 %	EPA475-5	0.00350	0.00374	107 %
Date Analyzed	---	---	---	07.07.92	---
Selenium (7740)					
Selenium, mg/l	90-110 %	SPEX	0.050	0.050	100 %
Date Analyzed	---	---	---	07.08.92	---
Silver (6010)					
Silver, mg/l	90-110 %	3-128AS	1.01	0.993	99 %
Date Analyzed	---	---	---	07.08.92	---
Sodium (6010)					
Sodium , mg/l	90-110 %	3-128AS	0.998	1.09	1.07 %
Date Analyzed	---	---	---	07.08.92	---

Methods: EPA SW-846.

Mercury MS Duplicate Result * = 0.00079 mg/l
*F61 = Matrix spikes were not recovered due to the abundance of a target analyte in the sample.
*F65 = Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

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Mr. Allen Motley
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97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/LTO #06567
Sampled By: Client

REPORT OF RESULTS

LOG NO SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES

43231-25 CCVS Result
43231-26 CCVS % Recovery

PARAMETER	43231-25	43231-26
Arsenic (7060)		
Arsenic, mg/l	0.051	102 %
Date Analyzed	07.08.92	---
Barium (6010)		
Barium, mg/l	1.01	101 %
Date Analyzed	07.08.92	---
Cadmium (6010)		
Cadmium, mg/l	1.00	100 %
Date Analyzed	07.08.92	---
Chromium (6010)		
Chromium, mg/l	1.04	104 %
Date Analyzed	07.08.92	---
Iron (6010)		
Iron, mg/l	0.935	94 %
Date Analyzed	07.08.92	---
Lead (7421)		
Lead , mg/l	0.051	102 %
Date Analyzed	07.08.92	---
Manganese (6010)		
Manganese, mg/l	1.00	100 %
Date Analyzed	07.08.92	---
Mercury (7470)		
Mercury, mg/l	0.00366	104 %
Date Analyzed	07.07.92	---

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LOG NO: S2-43231

Received: 03 JUL 92

Mr. Allen Motley
Geraghty and Miller
97 Midway Lane
Oak Ridge, Tennessee 37830

Project: TN20001/LTO #06567
Sampled By: Client

REPORT OF RESULTS

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR LIQUID SAMPLES
43231-25	CCVS Result
43231-26	CCVS % Recovery

PARAMETER	43231-25	43231-26
Selenium (7740)		
Selenium, mg/l	0.048	96 %
Date Analyzed	07.08.92	---
Silver (6010)		
Silver, mg/l	1.01	100 %
Date Analyzed	07.08.92	---
Sodium (6010)		
Sodium , mg/l	1.0	107 %
Date Analyzed	07.08.92	---

Methods: EPA SW-846.

Mercury MS Duplicate Result * = 0.00079 mg/l
*F61 = Matrix spikes were not recovered due to the abundance of a target analyte in the sample.
*F65 = Elevated detection limits were reported due to sample matrix interference which required sample dilution prior to analysis.

Janette D. Long

APPENDIX D

STATISTICAL ANALYSIS

APPENDIX D-1

CALCULATIONS FOR NON-SIGNIFICANT ANOVAS

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Arsenic**

Method Detection Limit: **0.010 mg/l**

NATURAL LOG OF CONCENTRATION IN GROUND-WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total Xl	Well Mean Xl	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	2.485	2.303	2.303	2.303	9.393	2.348	0.091	0.04
Upgradient Well	RT-2	3.784	2.303	2.303	2.303	10.692	2.673	0.741	0.28
Upgradient Well	RT-3	4.787	2.996	5.193	2.303	15.279	3.820	1.391	0.36
Downgradient Well	RT-4	3.135	2.303	2.303	2.303	10.043	2.511	0.416	0.17
Downgradient Well	RT-5	3.807	3.367	2.303	2.398	11.874	2.969	0.737	0.25
					Total	57.281	2.864	0.889	0.31

Between-Wells Sum of Squares:

SS wells = 5.4064
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 15.0316
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 9.6252
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	5.4064	4	1.3516	2.1
Within Wells	9.6252	15	0.6417	
Total	15.0316	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

GERAGHTY & MILLER, INC.

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Barium**

Method Detection Limit: **0.010 mg/l**

NATURAL LOG OF CONCENTRATION IN GROUND-WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	3.135	2.833	1.825	1.902	9.695	2.424	0.660	0.27
Upgradient Well	RT-2	3.332	1.825	1.946	2.282	9.385	2.346	0.685	0.29
Upgradient Well	RT-3	4.868	2.996	2.708	1.974	12.545	3.136	1.232	0.39
Downgradient Well	RT-4	3.638	3.738	2.565	2.833	12.773	3.193	0.583	0.18
Downgradient Well	RT-5	3.555	3.258	2.398	2.708	11.919	2.980	0.523	0.18
					Total	56.319	2.816	0.784	0.28

Between-Wells Sum of Squares:

SS wells = 2.5852
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 11.6897
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 9.1045
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	2.5852	4	0.6463	1.1
Within Wells	9.1045	15	0.6070	
Total	11.6897	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

GERAGHTY & MILLER, INC.

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Iron**

Method Detection Limit: **0.050 mg/l**

NATURAL LOG OF CONCENTRATION IN GROUND–WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	3.526	3.178	1.386	1.629	9.720	2.430	1.079	0.44
Upgradient Well	RT–2	4.234	0.642	0.531	1.960	7.367	1.842	1.722	0.94
Upgradient Well	RT–3	5.521	3.526	2.996	0.875	12.919	3.230	1.909	0.59
Downgradient Well	RT–4	4.078	3.738	2.041	2.485	12.341	3.085	0.977	0.32
Downgradient Well	RT–5	3.871	3.638	0.588	2.565	10.662	2.665	1.497	0.56
					Total	53.009	2.650	1.411	0.53

Between–Wells Sum of Squares:

SS wells = 4.9107
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 37.8227
Degrees of Freedom (no. observations – 1)= 19

Within–Wells Sum of Squares:

SS within = 32.9120
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	4.9107	4	1.2277	0.6
Within Wells	32.9120	15	2.1941	
Total	37.8227	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Lead**

Method Detection Limit: **0.0050 mg/l**

NATURAL LOG OF CONCENTRATION IN GROUND-WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total Xl	Well Mean Xl	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	3.091	1.932	1.609	1.609	8.241	2.060	0.704	0.34
Upgradient Well	RT-2	4.205	1.609	1.609	1.917	9.340	2.335	1.255	0.54
Upgradient Well	RT-3	5.011	2.890	2.674	1.609	12.185	3.046	1.424	0.47
Downgradient Well	RT-4	3.466	2.890	1.723	1.988	10.067	2.517	0.806	0.32
Downgradient Well	RT-5	2.944	2.639	1.609	1.825	9.017	2.254	0.639	0.28
					Total	48.851	2.443	0.966	0.40

Between-Wells Sum of Squares:

SS wells = 2.2514
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 17.7215
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 15.4701
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	2.2514	4	0.5628	0.5
Within Wells	15.4701	15	1.0313	
Total	17.7215	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

GERAGHTY & MILLER, INC.

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Manganese**

Method Detection Limit: **0.010 mg/L**

CONCENTRATION IN GROUND–WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	2	1.4	0.62	0.71	4.730	1.183	0.647	0.5
Upgradient Well	RT–2	3.2	0.44	0.38	0.66	4.680	1.170	1.359	1.2
Upgradient Well	RT–3	7.2	1.2	0.95	0.35	9.700	2.425	3.203	1.3
Downgradient Well	RT–4	1.5	1.5	1.4	1.5	5.900	1.475	0.050	0.0
Downgradient Well	RT–5	4.3	4.8	3.1	3	15.200	3.800	0.891	0.2
					Total	40.210	2.011	1.780	0.9

Between–Wells Sum of Squares:

SS wells = 20.2116
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 60.1749
Degrees of Freedom (no. observations – 1)= 19

Within–Wells Sum of Squares:

SS within = 39.9633
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	20.2116	4.0	5.0529	1.9
Within Wells	39.9633	15.0	2.6642	
Total	60.1749	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

GERAGHTY & MILLER, INC.

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Mercury**

Method Detection Limit: **0.00020 mg/L**

CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	<0.00020	<0.00020	<0.00020	<0.00020	0.00080	0.00020	0.00000	0.00
Upgradient Well	RT-2	<0.00020	<0.00020	<0.00020	<0.00020	0.00080	0.00020	0.00000	0.00
Upgradient Well	RT-3	0.0005	<0.00020	<0.00020	<0.00020	0.00110	0.00028	0.00015	0.55
Downgradient Well	RT-4	<0.00020	<0.00020	<0.00020	<0.00020	0.00080	0.00020	0.00000	0.00
Downgradient Well	RT-5	<0.00020	<0.00020	<0.00020	<0.00020	0.00080	0.00020	0.00000	0.00
					Total	0.00430	0.00022	0.00007	0.31

Between-Wells Sum of Squares:

SS wells = 0.00000
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 0.00000
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 0.00000
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	0.00000	4.0	0.00000	1.0
Within Wells	0.00000	15.0	0.00000	
Total	0.00000	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

GERAGHTY & MILLER, INC.

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **pH**

Method Detection Limit: **0.000 pH units**

CONCENTRATION IN GROUND-WATER SAMPLES
pH units

		Round 1	Round 2	Round 3	Round 4	Well Total XI	Well Mean XI	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	6	6.6	5.7	5.9	24.200	6.050	0.387	0.1
Upgradient Well	RT-2	6.1	6.6	6	6.3	25.000	6.250	0.265	0.0
Upgradient Well	RT-3	6.1	6.7	6.25	6.3	25.350	6.338	0.256	0.0
Downgradient Well	RT-4	6.6	6.5	6.5	7	26.600	6.650	0.238	0.0
Downgradient Well	RT-5	6.2	7.2	6.3	6.8	26.500	6.625	0.465	0.1
					Total	127.650	6.383	0.378	0.1

Between-Wells Sum of Squares:

SS wells = 1.0420
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 2.7164
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 1.6744
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	1.0420	4.0	0.2605	2.3
Within Wells	1.6744	15.0	0.1116	
Total	2.7164	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

GERAGHTY & MILLER, INC.

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Phenolics, Total Recoverable**

Method Detection Limit: **0.010 mg/L**

CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	<0.010	<0.020	<0.010	<0.010	0.040	0.010	0.000	0.0
Upgradient Well	RT-2	<0.010	<0.020	<0.010	<0.010	0.040	0.010	0.000	0.0
Upgradient Well	RT-3	0.052	<0.020	<0.010	<0.010	0.082	0.021	0.021	1.0
Downgradient Well	RT-4	<0.010	<0.020	<0.010	<0.010	0.040	0.010	0.000	0.0
Downgradient Well	RT-5	0.018	<0.020	<0.010	<0.010	0.048	0.012	0.004	0.3
					Total	0.250	0.013	0.009	0.8

Between-Wells Sum of Squares:

SS wells = 0.0003
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 0.0017
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 0.0014
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	0.0003	4.0	0.0001	0.9
Within Wells	0.0014	15.0	0.0001	
Total	0.0017	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic was not significant at the 5% level and statistically significant evidence of contamination does not exist.

APPENDIX D-2

CALCULATIONS FOR SIGNIFICANT ANOVAS

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Chromium**

Method Detection Limit: **0.010 mg/L**

REVISED

CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	0.099	0.069	0.018	0.014	0.194	0.049	0.042	0.9
Upgradient Well	RT-2	41	47	51	53.5	192.500	48.125	5.152	0.1
Upgradient Well	RT-3	77	45	78	81	322.000	80.500	1.416	0.0
Downgradient Well	RT-4	0.065	0.073	0.11	0.021	0.269	0.067	0.047	0.5
Downgradient Well	RT-5	0.059	0.049	<.010	0.013	0.122	0.031	0.022	0.7
					Total	515.085	26.754	34.082	1.3

Between-Wells Sum of Squares:

SS wells = 21919.466
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 22043.664
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 124.198
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Square	F Statistic
Between Wells	21919.466	4.0	5479.8665	661.8
Within Wells	124.198	15.0	8.2799	
Total	22043.664	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 42.8912
RT-4 = 42.8239
RT-5 = 42.8607

Standard Error = 1.6613

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 3.5386

Compare Difference Between Means to Critical Value
RT-4 = Difference is greater than critical value
RT-5 = Difference is greater than critical value

CONCLUSION:

Statistically Significant Difference Exists Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Exists Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Chromium**

Method Detection Limit: **0.010 mg/l**

NATURAL LOG OF CONCENTRATION IN GROUND–WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	4.585	4.234	2.565	2.639	14.023	3.506	1.054	0.30
Upgradient Well	RT–2	10.621	10.758	10.840	10.887	43.106	10.777	0.116	0.01
Upgradient Well	RT–3	11.252	11.350	11.277	11.302	45.181	11.295	0.042	0.00
Downgradient Well	RT–4	4.174	4.290	4.700	3.045	16.210	4.052	0.709	0.17
Downgradient Well	RT–5	4.060	3.638	2.303	2.773	12.773	3.193	0.800	0.25
					Total	131.294	6.565	3.807	0.58

Between–Wells Sum of Squares:

SS wells = 268.6140
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 275.4186
Degrees of Freedom (no. observations – 1) = 19

Within–Wells Sum of Squares:

SS within = 6.8046
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	268.6140	4	67.1535	148.0
Within Wells	6.8046	15	0.4536	
Total	275.4186	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 8.5259
RT–4 = 4.4734
RT–5 = 5.3326

Standard Error = 0.3889

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.8283

Compare Difference Between Means to Critical Value
RT–4 = Difference is greater than critical value
RT–5 = Difference is greater than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Exists at Well RT–4
Statistically Significant Evidence of Contamination Exists at Well RT–5

Solid Waste Management Unit: Equalization Lagoon

Constituent: Sodium

Method Detection Limit: 0.50 mg/L

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CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean	Well Standard Deviation	Well Variance
Upgradient Well	RT-1	99	91	87	100	377.000	94.000	6.055	0.1
Upgradient Well	RT-2	67	76	93	83.3	319.300	79.825	11.1	0.1
Upgradient Well	RT-3	130	120	109	110	469.000	117.250	11.087	0.1
Downgradient Well	RT-4	90	92	100	100	382.000	95.500	5.196	0.2
Downgradient Well	RT-5	110	100	91	90	391.000	97.750	9.464	0.1
					Total	1938.300	96.915	14.042	0.2

Between-Wells Sum of Squares:

SS wells =	3057.5500
Degrees of Freedom (no. wells - 1) =	4

Corrected-Total Sum of Squares:

SS total =	4889.7375
Degrees of Freedom (no. observations - 1) =	19

Within-Wells Sum of Squares:

SS within =	1832.1875
Degrees of Freedom = (no. observations - no. wells) =	15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Square	Statistic
Between Wells	3057.5500	4.0	764.3875	6.26
Within Wells	1832.1875	15.0	122.1458	
Total	4889.7375	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean =	95.8750
RT-4 =	2.1250
RT-5 =	0.8750

Standard Error = 6.2809

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 13.5912

Compare Difference Between Means to Critical Value

RT-4 = Difference is less than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration

Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Sodium**

Method Detection Limit: **0.50 mg/L**

CONCENTRATION IN GROUND–WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	98	91	87	100	376.000	94.000	6.055	0.1
Upgradient Well	RT–2	67	76	83	83.5	309.500	77.375	7.718	0.1
Upgradient Well	RT–3	130	120	105	110	465.000	116.250	11.087	0.1
Downgradient Well	RT–4	80	92	100	120	392.000	98.000	16.813	0.2
Downgradient Well	RT–5	110	100	87	90	387.000	96.750	10.436	0.1
					Total	1929.500	96.475	16.042	0.2

Between–Wells Sum of Squares:

SS wells = 3057.5500
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 4889.7375
Degrees of Freedom (no. observations – 1)= 19

Within–Wells Sum of Squares:

SS within = 1832.1875
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	3057.5500	4.0	764.3875	6.3
Within Wells	1832.1875	15.0	122.1458	
Total	4889.7375	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 95.8750
RT–4 = 2.1250
RT–5 = 0.8750

Standard Error = 6.3809

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 13.5912

Compare Difference Between Means to Critical Value
RT–4 = Difference is less than critical value
RT–5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Does Not Exist at Well RT–4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT–5

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Solid Waste Management Unit: Equalization Lagoon

Constituent: Specific Conductance

Method Detection Limit: 0.00 umhos/cm

CONCENTRATION IN GROUND-WATER SAMPLES
umhos/cm

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean	Well Variance	Well Coefficient of Variation
Upgradient Well	RT-1	590	540	570	590	2290	572.5	572.92	0.1
Upgradient Well	RT-2	510	550	650	700	2410	602.5	17.29	0.1
Upgradient Well	RT-3	600	760	700	810	2870	717.5	13291.7	0.2
Downgradient Well	RT-4	480	500	610	690	2280	570	10433.3	0.2
Downgradient Well	RT-5	770	724	680	670	2850	712.5	4538	0.1
					Total	12700	635	29073.8	0.2

Between-Wells Sum of Squares:

SS wells = 147150.00
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 218300.00
Degrees of Freedom (no. observations - 1) = 19

Within-Wells Sum of Squares:

SS within = 71150.00
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	
Between Wells	147150.00	4	36787.5000	7.74
Within Wells	71150.00	15	4743.3333	
Total	218300.00	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean = 635.8333
RT-4 = 100.8333
RT-5 = 48.6667

Standard Error = 39.7692

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 84.9958

Compare Differences Between Means to Critical Value

RT-4 = Difference is greater than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Exists Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Specific Conductance**

Method Detection Limit: **0.00 umhos/cm**

CONCENTRATION IN GROUND–WATER SAMPLES
umhos/cm

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	590	560	570	680	2400	600	54.77	0.1
Upgradient Well	RT–2	510	550	650	700	2410	603	87.70	0.1
Upgradient Well	RT–3	800	780	790	810	3180	795	12.91	0.0
Downgradient Well	RT–4	460	500	610	690	2260	565	104.72	0.2
Downgradient Well	RT–5	770	720	690	670	2850	713	43.49	0.1
					Total	13100	655	107.19	0.2

Between–Wells Sum of Squares:

SS wells = 147150.00
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 218300.00
Degrees of Freedom (no. observations – 1)= 19

Within–Wells Sum of Squares:

SS within = 71150.00
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	147150.00	4.0	36787.5000	7.8
Within Wells	71150.00	15.0	4743.3333	
Total	218300.00	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 665.8333
RT–4 = 100.8333
RT–5 = 46.6667

Standard Error = 39.7632

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 84.6956

Compare Difference Between Means to Critical Value
RT–4 = Difference is greater than critical value
RT–5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Exists at Well RT–4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT–5

Solid Waste Management Unit: **Equalization Lagoon**

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Constituent: Chloride

Method Detection Limit: 1.0 mg/L

CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	110	110	90	110	420.000	105.000	10.000	0.1
Upgradient Well	RT-2	42	51	39	[illegible]	[illegible]	[illegible]	[illegible]	0.2
Upgradient Well	RT-3	90	96	81	82	349.000	87.250	7.089	0.1
Downgradient Well	RT-4	[illegible]	61	[illegible]	40	[illegible]	[illegible]	[illegible]	0.1
Downgradient Well	RT-5	[illegible]	[illegible]	47	56	[illegible]	[illegible]	[illegible]	0.2
					Total	1515.500	[illegible]	[illegible]	0.3

Between-Wells Sum of Squares:

SS wells = 7348.5500
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 8995.2375
Degrees of Freedom (no. observations - 1) = 19

Within-Wells Sum of Squares:

SS within = 1646.6875
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	[illegible] F Statistic
Between Wells	7348.5500	4.0	1837.1375	[illegible]
Within Wells	1646.6875	15.0	109.7792	
Total	8995.2375	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 82.6417
RT-4 = 25.5417
RT-5 = 5.7917

Standard Error = 6.0492

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 12.8848

Compare Difference Between Means to Critical Value
RT-4 - Difference is greater than critical value
RT-5 - Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Exists Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Chloride**

Method Detection Limit: **1.0 mg/L**

CONCENTRATION IN GROUND–WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	110	110	90	110	420.000	105.000	10.000	0.1
Upgradient Well	RT–2	42	51	59	63.5	215.500	53.875	9.455	0.2
Upgradient Well	RT–3	90	96	81	82	349.000	87.250	7.089	0.1
Downgradient Well	RT–4	51	61	54	60	226.000	56.500	4.796	0.1
Downgradient Well	RT–5	73	79	97	56	305.000	76.250	16.919	0.2
					Total	1515.500	75.775	21.759	0.3

Between–Wells Sum of Squares:

SS wells = 7348.5500
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 8995.2375
Degrees of Freedom (no. observations – 1)= 19

Within–Wells Sum of Squares:

SS within = 1646.6875
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	7348.5500	4.0	1837.1375	16.7
Within Wells	1646.6875	15.0	109.7792	
Total	8995.2375	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 82.0417
RT–4 = 25.5417
RT–5 = 5.7917

Standard Error = 6.0492

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 12.8848

Compare Difference Between Means to Critical Value
RT–4 = Difference is greater than critical value
RT–5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Exists at Well RT–4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT–5

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Fluoride**

Method Detection Limit: **0.20 mg/L**

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CONCENTRATION IN GROUND-WATER SAMPLES

mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean $\bar{X}_i$	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	<0.20	<0.20	<0.20	<0.20	0.800	0.200	0.000	0.0
Upgradient Well	RT-2	<0.20	<0.20	<0.20	<0.20	0.800	0.200	0.000	0.0
Upgradient Well	RT-3	0.39	0.38	0.35	0.47	1.630	0.408	0.057	0.2
Downgradient Well	RT-4	<0.20	<0.20	0.2	0.24	0.840	0.206	0.018	0.1
Downgradient Well	RT-5	[illegible]	<0.20	[illegible]	<0.20	0.800	0.150	0.075	0.5
					Total	5.210	0.281	0.115	0.4

Between-Wells Sum of Squares:

SS wells =
Degrees of Freedom (no. wells − 1) = 0.1979
4

Corrected-Total Sum of Squares:

SS total =
Degrees of Freedom (no. observations − 1) = 0.2437
19

Within-Wells Sum of Squares:

SS within =
Degrees of Freedom = (no. observations − no. wells) = 0.0458
15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Square	F Statistic
Between Wells	0.1979	4.0	0.0495	16.2
Within Wells	0.0458	15.0	0.0031	
Total	0.2437	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference between Downgradient Means and Upgradient Mean

Upgradient Mean =	0.2658
RT-4 =	0.0783
RT-5 =	0.0483
Standard Error =	0.0018
Bonferroni T Statistic =	2.13
Critical Value = (Bonferroni T Statistic) * (Standard Error) =	0.0038

Compare Difference Between Means to Critical Value

RT-4 = Difference is greater than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Exists Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Fluoride**

Method Detection Limit: **0.20 mg/L**

CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	<0.20	<0.20	<0.20	<0.20	0.800	0.200	0.000	0.0
Upgradient Well	RT-2	<0.20	<0.20	<0.20	<0.20	0.800	0.200	0.000	0.0
Upgradient Well	RT-3	0.59	0.38	0.39	0.47	1.830	0.458	0.097	0.2
Downgradient Well	RT-4	<0.20	<0.20	0.2	0.23	0.830	0.208	0.015	0.1
Downgradient Well	RT-5	0.35	<0.20	<0.20	<0.20	0.950	0.238	0.075	0.3
					Total	5.210	0.261	0.113	0.4

Between-Wells Sum of Squares:

SS wells = 0.1979
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 0.2437
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 0.0458
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	0.1979	4.0	0.0495	16.2
Within Wells	0.0458	15.0	0.0031	
Total	0.2437	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 0.2858
RT-4 = 0.0783
RT-5 = 0.0483

Standard Error = 0.0319

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.0680

Compare Difference Between Means to Critical Value
RT-4 = Difference is greater than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Exists at Well RT-4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT-5

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Solid Waste Management Unit: Equalization Lagoon

Constituent: Nitrate

Method Detection Limit: 0.050 mg/L

CONCENTRATION IN GROUND-WATER SAMPLES

mg/L

		Round 1	Round 2	Round 3	Round 4	Total	Mean	Sample Standard Deviation	Coefficient of Variation
Upgradient Well	RT-3	0.14	0.14	0.17	0.17	0.620	0.155	0.015	0.1
Upgradient Well	RT-2	<0.50	<0.50	<0.50	<0.050	0.200	0.050	0.000	0.0
Upgradient Well	RT-3	<1.0	<1.0	<1.0	<0.050	0.200	0.050	0.000	0.0
Downgradient Well	RT-4	<0.050	<0.050	0.19	<0.050	0.340	0.085	0.069	0.8
Downgradient Well	RT-5	<0.050	0.11	0.17	<0.050	0.330	0.083	0.052	0.6
					Total	1.690	0.423	0.137	1.7

Between-Wells Sum of Squares:

SS wells = 0.3075
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 0.5982
Degrees of Freedom (no. observations - 1) = 19

Within-Wells Sum of Squares:

SS within = 0.2907
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Square	F-Statistic
Between Wells	0.3075	4.0	0.0769	4.0
Within Wells	0.2907	15.0	0.0194	
Total	0.5982	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean = 0.1583
RT-4 = 0.0733
RT-5 = 0.0967

Standard Error = 0.0804

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.1712

Compare Difference Between Means to Critical Value

RT-4 = Difference is less than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Nitrate**

Method Detection Limit: **0.050 mg/l**

NATURAL LOG OF CONCENTRATION IN GROUND–WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	4.094	3.526	3.611	2.944	14.176	3.544	0.472	0.13
Upgradient Well	RT–2	1.609	1.609	1.609	1.609	6.438	1.609	0.000	0.00
Upgradient Well	RT–3	1.609	1.609	1.609	1.609	6.438	1.609	0.000	0.00
Downgradient Well	RT–4	1.609	1.609	2.944	1.609	7.773	1.943	0.668	0.34
Downgradient Well	RT–5	1.609	2.398	4.043	1.609	9.660	2.415	1.147	0.48
					Total	44.484	2.224	0.929	0.42

Between–Wells Sum of Squares:

SS wells = 10.4525
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 16.4050
Degrees of Freedom (no. observations – 1)= 19

Within–Wells Sum of Squares:

SS within = 5.9525
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	10.4525	4	2.6131	6.6
Within Wells	5.9525	15	0.3968	
Total	16.4050	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 2.2543
RT–4 = 0.3111
RT–5 = 0.1607

Standard Error = 0.3637

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.7747

Compare Difference Between Means to Critical Value
RT–4 = Difference is less than critical value
RT–5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Does Not Exist at Well RT–4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT–5

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Solid Waste Management Unit: Equalization Lagoon

Constituent: Sulfate

Method Detection Limit: 5.0 mg/L

CONCENTRATION IN GROUND-WATER SAMPLES

mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	88	88	110	94	380	95	10.8	0.1
Upgradient Well	RT-2	83	94	97	87	361	90.25	6.18	0.1
Upgradient Well	RT-3	92	110	116	118	436	109	12.2	0.1
Downgradient Well	RT-4	65	62	119	116	362	90.5	27.8	0.3
Downgradient Well	RT-5	110	130	130	120	490	122.5	10.3	0.1
					Total	2069.500	101.125	19.07	0.2

Between-Wells Sum of Squares:

SS wells =	3469.5000
Degrees of Freedom (no. wells - 1) =	4

Corrected - Total Sum of Squares:

SS total =	6311.9375
Degrees of Freedom (no. observations - 1) =	19

Within-Wells Sum of Squares:

SS within =	2842.4375
Degrees of Freedom = (no. observations - no. wells) =	15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	3469.5000	4	867.3750	4.58
Within Wells	2842.4375	15	189.4958	
Total	6311.9375	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean =	97.9583
RT-4 =	3.7083
RT-5 =	29.5417

Standard Error =	7.8477
Bonferroni T Statistic =	2.13
Critical Value = (Bonferroni T Statistic) * (Standard Error) =	16.7285

Compare Difference Between Means to Critical Value

RT-4 = Difference is less than critical value
RT-5 = Difference is greater than critical value

CONCLUSION:

Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Exists Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Sulfate**

Method Detection Limit: **5.0 mg/L**

CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	88	98	110	96	392.000	98.000	9.092	0.1
Upgradient Well	RT-2	83	94	97	87.5	361.500	90.375	6.316	0.1
Upgradient Well	RT-3	92	110	110	110	422.000	105.500	9.000	0.1
Downgradient Well	RT-4	65	92	110	110	377.000	94.250	21.266	0.2
Downgradient Well	RT-5	110	130	150	120	510.000	127.500	17.078	0.1
					Total	2062.500	103.125	18.227	0.2

Between-Wells Sum of Squares:

SS wells = 3469.5000
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 6311.9375
Degrees of Freedom (no. observations - 1) = 19

Within-Wells Sum of Squares:

SS within = 2842.4375
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	3469.5000	4.0	867.3750	4.6
Within Wells	2842.4375	15.0	189.4958	
Total	6311.9375	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 97.9583
RT-4 = 3.7083
RT-5 = 29.5417

Standard Error = 7.9477

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 16.9285

Compare Difference Between Means to Critical Value
RT-4 = Difference is less than critical value
RT-5 = Difference is greater than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Does Not Exist at Well RT-4
Statistically Significant Evidence of Contamination Exists at Well RT-5

Solid Waste Management Unit: Equalization Lagoon

Constituent: TOC

Method Detection Limit: 0.010 mg/L

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CONCENTRATION IN GROUND–WATER SAMPLES

mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean	Well Standard Deviation	Well Variance
Upgradient Well	RT–1	6	9.7	4.7	5.1	19.500	4.875	0.410	0.2
Upgradient Well	RT–2	8	9.5	14	8.5	39.900	9.975	2.668	7.1
Upgradient Well	RT–3	8.6	11	9.75	7.4	36.750	9.188	1.448	2.1
Downgradient Well	RT–4	7	4.8	3.8	5.3	20.700	5.175	0.918	0.8
Downgradient Well	RT–5	4.4	3.2	3.1	3.8	14.500	3.625	0.318	0.1
					Total	140.850	7.043	4.241	17.9

Between–Wells Sum of Squares:

SS wells =
Degrees of Freedom (no. wells – 1) – 210.2470
4

Corrected Total Sum of Squares:

SS total –
Degrees of Freedom (no. observations – 1)– 415.1964
19

Within–Wells Sum of Squares:

SS within –
Degrees of Freedom = (no. observations – no. wells) = 234.9494
15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Wells	210.2470	4.0	52.5618	3.36
Within Wells	234.9494	15.0	15.6633	
Total	445.1964	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 8.8042
RT–4 = 5.4250
RT–5 = 4.3792

Standard Error = 2.2650

Bonferroni T Statistic = 2.15

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 4.8670

Compare Difference Between Means to Critical Value
RT–4 = Difference is less than critical value
RT–5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT–4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT–5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **TOC**

Method Detection Limit: **0.010 mg/L**

CONCENTRATION IN GROUND-WATER SAMPLES
mg/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	5	3.7	4.7	5.1	18.500	4.625	0.640	0.1
Upgradient Well	RT-2	4.6	6.5	14	8.3	33.400	8.350	4.058	0.5
Upgradient Well	RT-3	6.6	11	9.75	24	51.350	12.838	7.668	0.6
Downgradient Well	RT-4	7	4.8	3.8	5.1	20.700	5.175	1.338	0.3
Downgradient Well	RT-5	4.8	5.2	3.3	3.6	16.900	4.225	0.918	0.2
					Total	140.850	7.043	4.841	0.7

Between-Wells Sum of Squares:

SS wells = 210.2470
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 445.1964
Degrees of Freedom (no. observations - 1) = 19

Within-Wells Sum of Squares:

SS within = 234.9494
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	210.2470	4.0	52.5618	3.4
Within Wells	234.9494	15.0	15.6633	
Total	445.1964	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 8.6042
RT-4 = 3.4292
RT-5 = 4.3792

Standard Error = 2.2850

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 4.8670

Compare Difference Between Means to Critical Value
RT-4 = Difference is less than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Does Not Exist at Well RT-4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT-5

Solid Waste Management Unit: Equalization Lagoon

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Constituent: TOX

Method Detection Limit: 0.010 mg/l

NATURAL LOG OF CONCENTRATION IN GROUND-WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total X_i	Well Mean $\bar{X}_i$	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	1.872	6.135	2.398	2.398	[illegible]	[illegible]	0.520	0.21
Upgradient Well	RT-2	7.378	8.417	8.683	8.639	33.197	8.299	0.618	0.02
Upgradient Well	RT-3	8.0[illegible]	8.412	8.035	8.284	32.800	8.200	0.183	0.02
Downgradient Well	RT-4	4.700	6.136	5.438	5.431	20.795	5.199	0.30[illegible]	0.07
Downgradient Well	RT-5	6.477	6.380	6.316	6.168	25.336	6.318	0.136	0.02
					Total	121.872	6.094	2.201	0.5[illegible]

Between-Wells Sum of Squares:

SS wells = 93.6932
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 96.2408
Degrees of Freedom (no. observations - 1) = 19

Within-Wells Sum of Squares:

SS within = 2.5476
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	93.6932	4	23.4233	137.9
Within Wells	2.5476	15	0.1698	
Total	96.2408	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean =	6.3167
RT-4 =	1.1177
RT-5 =	0.0024

Standard Error = 0.2379

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.5066

Compare Difference Between Means to Critical Value
RT-4 = Difference is greater than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Exists Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **TOX**

Method Detection Limit: **0.010 mg/l**

NATURAL LOG OF CONCENTRATION IN GROUND–WATER SAMPLES
mg/l

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	1.872	3.135	2.398	2.398	9.803	2.451	0.520	0.21
Upgradient Well	RT–2	7.378	8.497	8.683	8.639	33.197	8.299	0.619	0.07
Upgradient Well	RT–3	8.039	8.412	8.055	8.294	32.800	8.200	0.183	0.02
Downgradient Well	RT–4	4.700	5.136	5.438	5.521	20.796	5.199	0.371	0.07
Downgradient Well	RT–5	6.477	6.380	6.310	6.109	25.276	6.319	0.156	0.02
					Total	121.872	6.094	2.251	0.37

Between–Wells Sum of Squares:

SS wells = 93.6932
Degrees of Freedom (no. wells – 1) = 4

Corrected–Total Sum of Squares:

SS total = 96.2408
Degrees of Freedom (no. observations – 1) = 19

Within–Wells Sum of Squares:

SS within = 2.5476
Degrees of Freedom = (no. observations – no. wells) = 15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	93.6932	4	23.4233	137.9
Within Wells	2.5476	15	0.1698	
Total	96.2408	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 6.3167
RT–4 = 1.1177
RT–5 = 0.0024

Standard Error = 0.2379

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.5068

Compare Difference Between Means to Critical Value
RT–4 = Difference is greater than critical value
RT–5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Exists at Well RT–4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT–5

Constituent: cis/trans-1,2-Dichloroethene

Method Detection Limit: 5.0 ug/L

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CONCENTRATION IN GROUND-WATER SAMPLES

ug/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-3	2.5	5.0	5.0	2.5	15.000	3.750	1.258	0.3
Upgradient Well	RT-2	2900	4300	5700	2500	15400.000	3850.000	1662.408	0.4
Upgradient Well	RT-1	4600	2900	3650	3270	14420.000	3605.000	839.804	0.2
Downgradient Well	RT-4	2.5	3000	5200	5.0	8210.000	2052.500	2495.882	1.2
Downgradient Well	RT-5	5400	4800	4400	2.5	14602.500	3650.625	2046.735	0.6
					Total	52647.500	13162.375		0.6

Between-Wells Sum of Squares:

SS wells =	51169485.05
Degrees of Freedom (no. wells - 1) =	4

Corrected-Total Sum of Squares:

SS total =	96896479.47
Degrees of Freedom (no. observations - 1)=	19

Within-Wells Sum of Squares:

SS within =	45726994.42
Degrees of Freedom = (no. observations - no. wells) =	15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Square	F
Between Wells	51169485.05	4.0	12792371.26	4.2
Within Wells	45726994.42	15.0	3048466.29	
Total	96896479.47	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean =	2755.4750
RT-4 =	667.8750
RT-5 =	990.7750

Standard Error =	1008.1117
Bonferroni T Statistic =	2.13

Critical Value (Bonferroni T Statistic) * (Standard Error) = 2147.2779

Compare Difference Between Means to Critical Value

RT-4 = Difference is less than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **cis/trans−1,2−Dichloroethene**

Method Detection Limit: **5.0 ug/L**

CONCENTRATION IN GROUND−WATER SAMPLES
ug/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT−1	2.5	5.5	5.2	2.5	15.700	3.925	1.463	0.4
Upgradient Well	RT−2	2600	4500	5700	2500	15300.000	3825.000	1552.149	0.4
Upgradient Well	RT−3	4600	3800	3650	5700	17750.000	4437.500	939.304	0.2
Downgradient Well	RT−4	25	3000	5200	125	8350.000	2087.500	2491.695	1.2
Downgradient Well	RT−5	5400	4800	4300	125	14625.000	3656.250	2396.732	0.7
					Total	56040.700	2802.035	2257.950	0.8

Between−Wells Sum of Squares:

SS wells = 51163465.05
Degrees of Freedom (no. wells − 1) = 4

Corrected−Total Sum of Squares:

SS total = 96896479.47
Degrees of Freedom (no. observations − 1) = 19

Within−Wells Sum of Squares:

SS within = 45733014.42
Degrees of Freedom = (no. observations − no. wells) = 15

ONE−WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	51163465.05	4.0	12790866.26	4.2
Within Wells	45733014.42	15.0	3048867.63	
Total	96896479.47	19.0		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T−TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 2755.4750
RT−4 = 667.9750
RT−5 = 900.7750

Standard Error = 1008.1117

Bonferroni T Statistic = 2.13

Critical Value (Bonferroni T Statistic) * (Standard Error) = 2147.2779

Compare Difference Between Means to Critical Value
RT−4 = Difference is less than critical value
RT−5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Does Not Exist at Well RT−4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT−5

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Solid Waste Management Unit: Equalization Lagoon

Constituent: Trichloroethene

Method Detection Limit: 5.0 ug/L

NATURAL LOG OF CONCENTRATION IN GROUND-WATER SAMPLES

ug/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean $\bar{x}$	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	4.466	4.868	5.136	4.868	19.337	4.834	0.276	0.06
Upgradient Well	RT-2	10.878	13.398	11.775	11.775	47.826	11.956	0.973	0.08
Upgradient Well	RT-3	11.252	10.859	10.640	9.858	42.609	10.648	0.690	0.06
Downgradient Well	RT-4	8.670	8.215	8.767	8.476	34.128	8.532	0.248	0.03
Downgradient Well	RT-5	8.851	8.649	9.1482	8.987	35.636	8.909	0.213	0.02
					Total	179.536	8.980	2.831	0.31

Between-Wells Sum of Squares:

SS wells = 129.8846
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 131.5168
Degrees of Freedom (no. observations - 1) = 19

Within-Wells Sum of Squares:

SS within = 1.6322
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F-Statistic
Between Wells	129.8846	4	32.4712	298.4
Within Wells	1.6322	15	0.1088	
Total	131.5168	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean = 9.0096
RT-4 = 2.7570
RT-5 = 0.1745

Standard Error = 0.1995

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.4067

Compare Difference Between Means to Critical Value

RT-4 = *Difference is greater than critical value*
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Exists Between Mean Concentration at Well RT-4 and Upgradient Mean Concentration Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT-5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Trichloroethene**

Method Detection Limit: **5.0 ug/L**

NATURAL LOG OF CONCENTRATION IN GROUND–WATER SAMPLES
ug/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT–1	4.466	4.868	5.136	4.868	19.337	4.834	0.276	0.06
Upgradient Well	RT–2	10.878	11.408	11.775	11.232	45.293	11.323	0.373	0.03
Upgradient Well	RT–3	11.252	10.859	10.840	10.859	43.809	10.952	0.200	0.02
Downgradient Well	RT–4	5.670	6.215	6.757	6.477	25.118	6.280	0.463	0.07
Downgradient Well	RT–5	8.854	8.949	9.148	8.497	35.448	8.862	0.273	0.03
					Total	169.005	8.450	2.631	0.31

Between–Wells Sum of Squares:

SS wells =	129.8846
Degrees of Freedom (no. wells – 1) =	4

Corrected–Total Sum of Squares:

SS total =	131.5168
Degrees of Freedom (no. observations – 1) =	19

Within–Wells Sum of Squares:

SS within =	1.6322
Degrees of Freedom = (no. observations – no. wells) =	15

ONE–WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	129.8846	4	32.4712	298.4
Within Wells	1.6322	15	0.1088	
Total	131.5168	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T–TEST

Difference Between Downgradient Means and Upgradient Mean

Upgradient Mean =	9.0366
RT–4 =	2.7570
RT–5 =	0.1745

Standard Error = 0.1905

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 0.4057

Compare Difference Between Means to Critical Value

RT–4 =	Difference is greater than critical value
RT–5 =	Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Exists at Well RT–4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT–5

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Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Vinyl Chloride**

Method Detection Limit: 5.0 ug/L

NATURAL LOG OF CONCENTRATION IN GROUND—WATER SAMPLES ug/L

		Round 1	Round 2	Round 3	Round 4	Well Total	Well Mean	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	0.916	1.609	1.609	1.609	5.745	1.436	0.347	0.24
Upgradient Well	RT-2	1.609	1.609	1.609	1.609	6.436	1.609	0.000	0.00
Upgradient Well	RT-3	1.609	1.609	1.609	1.609	6.436	1.609	0.000	0.00
Downgradient Well	RT-4	1.609	6.328	7.003	[illegible]	[illegible]	[illegible]	2.559	0.47
Downgradient Well	RT-5	1.609	1.609	1.609	1.609	6.436	1.609	0.000	0.00
					Total	[illegible]	[illegible]	[illegible]	[illegible]

Between—Wells Sum of Squares:

SS wells = 47.7250
Degrees of Freedom (no. wells − 1) = 4

Corrected - Total Sum of Squares

SS total = 67.7235
Degrees of Freedom (no. observations − 1) = 19

Within -Wells Sum of Squares:

SS within = 19.9985
Degrees of Freedom = (no. observations − no. wells) = 15

ONE—WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	47.7250	4	11.9312	[illegible]
Within Wells	19.9985	15	1.3332	
Total	67.7235	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant differences exist.

BONFERRONI T—TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 1.5517
RT—4 = 3.8727
RT-5 = 0.0578

Standard Error = 0.6666

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 1.4199

Compare Difference Between Means to Critical Value
RT—4 = Difference is greater than critical value
RT 5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Difference Exists Between Mean Concentration at Well RT—4 and Upgradient Mean Concentration
Statistically Significant Difference Does Not Exist Between Mean Concentration at Well RT—5 and Upgradient Mean Concentration

Solid Waste Management Unit: **Equalization Lagoon**

Constituent: **Vinyl Chloride**

Method Detection Limit: **5.0 ug/L**

NATURAL LOG OF CONCENTRATION IN GROUND-WATER SAMPLES
ug/L

		Round 1	Round 2	Round 3	Round 4	Well Total Xi	Well Mean Xi	Well Standard Deviation	Well Coefficient of Variation
Upgradient Well	RT-1	0.916	1.609	1.609	1.609	5.745	1.436	0.347	0.24
Upgradient Well	RT-2	1.609	1.609	1.609	1.609	6.438	1.609	0.000	0.00
Upgradient Well	RT-3	1.609	1.609	1.609	1.609	6.438	1.609	0.000	0.00
Downgradient Well	RT-4	1.609	6.328	7.003	6.757	21.697	5.424	2.559	0.47
Downgradient Well	RT-5	1.609	1.609	1.609	1.609	6.438	1.609	0.000	0.00
					Total	46.755	2.338	1.888	0.81

Between-Wells Sum of Squares:

SS wells = 47.7250
Degrees of Freedom (no. wells - 1) = 4

Corrected-Total Sum of Squares:

SS total = 67.7235
Degrees of Freedom (no. observations - 1)= 19

Within-Wells Sum of Squares:

SS within = 19.9985
Degrees of Freedom = (no. observations - no. wells) = 15

ONE-WAY PARAMETRIC ANOVA TABLE

	Sum of Squares	Degrees of Freedom	Mean Squares	F Statistic
Between Wells	47.7250	4	11.9313	8.9
Within Wells	19.9985	15	1.3332	
Total	67.7235	19		

CONCLUSION:

The Tabulated F value with 4 and 15 degrees of freedom at the 5% significance level is 3.06, therefore
The F statistic is significant at the 5% level and statistically significant evidence of contamination exists.

BONFERRONI T-TEST

Difference Between Downgradient Means and Upgradient Mean
Upgradient Mean = 1.5517
RT-4 = 3.8727
RT-5 = 0.0578

Standard Error = 0.6666

Bonferroni T Statistic = 2.13

Critical Value = (Bonferroni T Statistic) * (Standard Error) = 1.4199

Compare Difference Between Means to Critical Value
RT-4 = Difference is greater than critical value
RT-5 = Difference is less than critical value

CONCLUSION:

Statistically Significant Evidence of Contamination Exists at Well RT-4
Statistically Significant Evidence of Contamination Does Not Exist at Well RT-5

APPENDIX C

FINANCIAL ASSURANCE

Textron Inc.

40 Westminster Street
Providence, R.I. 02903
401/421-2800

April 24, 1992

Executive Director
Mississippi Department of Environmental Quality
2380 Highway 80 West
Jackson, MS 39204

RE: Updated Financial Assurance Requirements Demonstrating Financial Responsibility for Liability Coverage and Closure and Post-Closure Care

Dear Sir or Madam:

I am the Chief Financial Officer of Textron Inc., 40 Westminster Street, Providence, Rhode Island 02903. This letter is in support of the use of the financial test to demonstrate financial responsibility for liability coverage and closure and/or post-closure care as specified in Subpart H of MHWMR Parts 264 and 265.

The firm identified above is the owner or operator of the following facilities for which liability coverage for both sudden and non-sudden accidental occurrences is being demonstrated through the financial test specified in Subpart H of MHWMR Parts 264 and 265.

Randall Division of Textron Inc., Grenada Highway #332 East Rt. 2, Grenada,MS 38901 - EPA #MSD007037278.

The firm identified above guarantees, through the corporate guarantee specified in Subpart H of MHWMR Parts 264 and 265, liability coverage for both sudden and non-sudden accidental occurrences at the following facilities owned or operated by the following subsidiaries of the firm: None

1. The firm identified above owns or operates the following facilities which are in the State of Mississippi for which financial assurance for closure and/or post-closure care is demonstrated through the financial test specified in Subpart H of MHWMR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by the test are shown for each facility.

Randell Division of Textron Inc., Grenada Highway #332 East Rt. 2, Grenada, MS 38901 - EPA #MSD007037278. Closure - $ 854,700 Post-closure - $ -0-.

2. The firm identified above guarantees, through the corporate guarantee specified in Subpart H of MHWMR Parts 264 and 265, the closure and post-closure care of the following facilities which are located in the State of Mississippi owned or operated by its subsidiaries. The current cost estimates for the closure or post-closure care so guaranteed are shown for each facility: None

3. In states where EPA is not administering the financial requirements of Subpart H of MHWMR Parts 264 and 265, this firm is demonstrating financial assurance for the closure or post-closure care of the following facilities through the use of a test equivalent or substantially equivalent to the financial test specified in Subpart H of MHWMR Parts 264 and 265. The current closure and/or post-closure cost estimates covered by such a test or guarantee are shown for each facility: See attached Exhibit A

4. The firm identified above owns or operates the following hazardous waste management facilities for which financial assurance for closure, or if a disposal facility, for post-closure care, is not demonstrated either to EPA or a State through the financial test or any other financial assurance mechanism specified in Subpart H of MHWMR Parts 264 and 265, or equivalent or substantially equivalent State mechanisms. The current closure and/or post-closure cost estimates not covered by such financial assurance are shown for each facility: None

5. This firm is the owner or operator of the following UIC facilities for which financial assurance for plugging and abandonment is required under Part 144. The current closure cost estimates as required by 40 CFR 144.62 are shown for each facility: None

The firm is required to file a Form 10K with the Securities and Exchange Commission (SEC) for the latest fiscal year.

The fiscal year of this firm ends on the Saturday nearest to the thirty-first day of December in each year, whether such Saturday falls in December or in January. The figures for the following items marked with an asterisk are derived from this firm's independently audited, year-end financial statements and footnotes for the latest completed fiscal year, ended December 28, 1991.

ALTERNATIVE II

1.	Sum of current closure and post-closure cost estimates (total of all cost estimates listed above)	$ 6,403,601
2.	Amount of annual aggregate liability coverage to be demonstrated	$ 8,000,000
3.	Sum of lines 1 and 2	$ 14,403,601
4.	Current bond rating of most recent issuance and name of rating service	A3 - Moody's
5.	Date of issuance of bond	February 5, 1989
6.	Date of maturity of bond	February 5, 1995
*7.	Tangible net worth (if any portion of the closure or post-closure cost estimates is included in "total liabilities" on your financial statements you may add that portion to this line)	$1,869,700,000.
*8.	Total assets in the U.S. (required only if less than 90% of assets are located in U.S.)	$13,043,000,000.

		YES	NO
9.	Is line 7 at least $10 million?	X	
10.	Is line 7 at least 6 times line 3?	X	
*11.	Are at least 90% of assets located in the U.S.? If not, complete line 12		X
12.	Is line 8 at least 6 times line 3?	X	

I hereby certify that the wording of this letter is identical to the wording specified in MHWMR Section 264.151(g), as such regulations were constituted on the date shown immediately below.

TEXTRON INC.

By: _____
Dennis G. Little
Executive Vice President and
Chief Financial Officer

Dated: 4/24/92

TEXTRON INC.

By: _____
Richard A. McWhirter
Senior Vice President
and Secretary

Dated: 4/24/92

Exhibit A

	Location	EPA #	Closure Costs	Post Closure Costs
Bell* Aerospace	2221 Niagara Falls Blvd. Wheatfield NY 14304	NYD002106276	$ -0-	$ 3,452,933
E-Z-Go	Marvin Griffin Road Augusta, GA 30913	GAD003302064	$ 125,768	$ -0-
Homelite	Little Mountain Road Gastonia, NC 28052	NCD091249417	$ -0-	$ 1,970,200

* Currently known as Textron Defense Systems

MISSFIN/FKEC.DLY

ERNST & YOUNG

277 Park Avenue
New York, New York 10172

Phone 212 [illegible] 3000

REPORT OF INDEPENDENT AUDITORS

The Board of Directors
Textron Inc.

We have audited, in accordance with generally accepted auditing standards, the consolidated balance sheet of Textron Inc. as of December 28, 1991 and the related consolidated statements of income, cash flows and changes in shareholders' equity for the year then ended and have issued our report thereon dated February 6, 1992.

At your request, we have read the letter dated April 24, 1992 from Dennis G. Little, Executive Vice President and Chief Financial Officer and Richard A. McWhirter, Senior Vice President and Secretary, of Textron Inc. in support of the use of the financial test, as specified in Subpart H of MHWMR Parts 264 and 265, to demonstrate financial responsibility for liability coverage and closure and/or post-closure care of the Corporation's hazardous waste facilities at the locations listed in the letter.

In connection with Subpart H of MHWMR Parts 264 and 265, we have compared amounts included in the audited consolidated financial statements of Textron Inc. for the year ended December 28, 1991, the latest fiscal year, to the data in the letter indicated as being derived from such audited financial statements. In connection with this comparison, no matters came to our attention that caused us to believe that the data indicated as being derived from the audited financial statements should be adjusted.

This report is intended solely to assist you in complying with the reporting requirements associated with the financial test, as specified in Subpart H of MHWMR Parts 264 and 265, to demonstrate financial responsibility for liability coverage and closure and/or post-closure care and should not be used for any other purpose.

Ernst + Young

April 24, 1992

file Grenada
Eq. Lag -
Cost EST

Textron Inc.

40 Westminster Street
Providence, R.I. 02903
401/421-2800

May 5, 1992

VIA OVERNIGHT COURIER

Bruce Ferguson
Hazardous Waste Divisions
Mississippi Department of Environmental Quality
2380 Highway 80 West
Jackson, MS 39204

Re: Financial Responsibility For Liability Coverage and Closure and Post Closure Care

Dear Mr. Ferguson:

Enclosed please find a copy of Textron's financial responsibility documentation for its Randall Division in Grenada, MS. This documentation reflects the revision noted in your letter dated April 6, 1992. The revision concerned changing the reference to 40 CFR to MHWMR.

Should you have any questions, please do not hesitate to call me at (401) 457-2215.

Sincerely,

Patricia A. Iezzi
Senior Environmental Specialist

cc: Mark Williams - Randall ✓
Ellen Kaloostian - Ernst & Young
(w/enclosures)

RANDALL TEXTRON

Randall Division of Textron Inc.
10179 Commerce Park Drive
Cincinnati, Ohio 45246
513/896-9400

June 9, 1993

Mr. Bruce Ferguson
State of Mississippi
Department of Environmental Quality
Office of Pollution Control
P.O. Box 10385
Jackson, MS 39389-0385

DIVISION OF HAZARDOUS WASTE
REVIEWED BY BD
DATE 10/23/93
COMMENTS Mailed Copy to EPA
6/23/93

Subject: Request for Modification
Equalization Lagoon Closure Plan
Randall Textron
Grenada, Mississippi

Dear Mr. Ferguson:

This letter follows up on our recent discussions and requests a modification of Randall Textron's closure plan for the equalization lagoon at Randall's Grenada, Mississippi facility. As discussed below, however, some of Randall's proposed modifications are contingent on the resolution of certain regulatory issues. Randall requests expedited resolution of these issues before Department approval of the revised closure plan.

As you know, Randall submitted a closure plan for the equalization lagoon and was awaiting approval of the closure plan, when the U.S. Environmental Protection Agency issued its new Corrective Action Management Unit (CAMU) rule on February 16, 1993 (58 Fed. Reg. 8658). Following discussions with your office, Randall sent you a letter dated May 12, 1993, requesting an opportunity to modify the closure plan in order to take advantage of the CAMU rule. Based on our review of the CAMU rule, however, it is unclear how the new rule would apply to Randall's proposed modifications, or indeed, whether it would apply at all. It is also unclear whether other regulatory issues may be raised by the modified closure plan being considered.

In order to expedite review of these issues and approval of Randall's closure plan, this letter outlines the proposed modifications and seeks the Department's guidance on their regulatory feasibility. We would appreciate your review of the proposed modifications so that we can develop a consensus and proceed with the closure program.

SUMMARY OF APPROACH

Based on the comments received from the Mississippi Office of Pollution Control on the Equalization Lagoon Closure and Post-Closure Plan, Randall requested prospective contractors to develop proposals for closure. These proposals are presently being developed to provide for stabilization of waste within the lagoon and construction of a cap above the entire lagoon, as outlined in the original closure plan. Discussions with potential contractors, however, have indicated that a number of potential benefits might be achieved by modifying some elements of the original approach.

The first set of proposed modifications relates to the waste stabilization process. A new stabilization agent (pelletized quicklime) has been identified as more appropriate than cement. In addition, stabilization in-place is complicated by the fact that the bottom of the lagoon at the northwest end may intercept the groundwater surface. This was noted previously as the reason for requiring closure in-place. In order to facilitate the stabilization process and to limit potential contact of the waste with groundwater, Randall believes it would be appropriate to place a layer of soil beneath the impoundment to an elevation above the level of seasonal influences. Placement of a layer of soil beneath the stabilized sludge would necessitate movement of sludge within the impoundment prior to stabilization. This movement of sludge would enhance mixing of the waste with the stabilization agent and increase homogeneity within stabilized waste.

The second set of proposed modifications relates to the size and function of the closed waste unit. The degree of environmental protection provided by stabilizing the waste in-place and capping the entire waste unit is adequate, since no leachable characteristics have been identified through previous analyses. While leachability of the waste is not anticipated, however, there could be benefits from further isolating the stabilized waste from the groundwater. Therefore, if it is determined to be consistent with regulatory requirements, Randall proposes to construct a cell with a flexible polyethylene membrane on less than one-half

of the current waste unit and to cap the cell. The remaining (uncapped) portion of the current waste unit would be filled with soil of sufficient thickness to support revegetation. This approach would provide greater waste isolation, would minimize the land area exposed to the waste, and would reduce future maintenance requirements. If this approach is regulatorily feasible, it would best meet the intent of EPA guidance to provide an effective, permanent impoundment closure.

REVISED CLOSURE APPROACH

Based on the considerations in the previous section, and following discussions with prospective contractors, a modified closure approach has been developed. The modified closure activities are summarized in the following paragraphs, while details of the lagoon configuration following closure are shown on Figures 1, 2, and 3.

Sludge Stabilization - Sludges were originally planned for stabilization using cement. However, because of potential fugitive dust emissions during incorporation into the waste, a pelletized quicklime has been identified as a more appropriate stabilization agent. The use of quicklime would not provide the same degree of chemically deceived compressive strength, but would meet relevant criteria for limiting settlement of the cap. Accordingly, settlement would be limited by physical densification using conventional compaction methodologies. The density of the resulting compacted mass would be correlated to an estimate of potential settlement using geotechnical laboratory analyses.

Lagoon Bottom Modification - The depth of the lagoon within the northwest end may exceed the depth to groundwater as noted previously. Therefore, a protective layer of soils would be installed over the base of the lagoon as necessary to eliminate potential contact between groundwater and the stabilized waste, as shown schematically on Figure 1.

To place soils within the bottom of the lagoon, it would be necessary to first move the sludges from within the area requiring the addition of soil. Removal of these sludges would be performed down to the waste/soil contact. To ensure that sludges are adequately removed, careful inspection of the pond bottom would be performed and would be coupled with sampling and characterization of the soils characteristics (i.e. sand. clay, etc.).

Once wastes are removed from the pond bottom, and appropriate samples have been obtained, a layer of sandy soils would be installed. These soils would be cohesionless in nature to provide the greatest degree of stability within the bottom of the lagoon. This material would then be leveled and compacted to provide a surface acceptable for the installation of a liner.

Cell Construction - Once the pond bottom soils have been placed and compacted, a retention berm would be constructed as shown on Figures 1 and 2. Following construction of the berm, the resulting cell would be lined with a flexible polyethylene membrane. This membrane would be anchored around the perimeter of the cell to provide permanent containment. The lining material would be placed, seamed, and inspected using a defined QA/QC protocol.

Waste Placement - After installation of the cell lining, the stabilized waste would be trans-loaded from the unlined area of the cell to the lined area using a hydraulic excavator. Once a sufficient cover of waste has been placed, a bulldozer would be used to place waste within the lined cells in lifts. Each of these lifts would then be compacted to a sufficient degree to ensure that settlement would not impact the function or integrity of the cap. Samples of the compacted waste would be obtained to determine the geotechnical properties for settlement estimates.

Wastes would be removed from the unlined cell until the original soils beneath the impoundment are exposed. The extent of removal would be determined by establishing surveyed ground control points.

Cap Construction - Following placement and compaction of the final lift of waste, the exposed surface would be

graded to facilitate placement of soils for the cap. The cap would then be constructed in accordance with the requirements described in the closure plan.

Because of the addition of the bottom liner, a polyethylene membrane liner would be added in the cap. This liner would be placed between the drainage layer and above the lower liner component. With the addition of the liner membrane, it is proposed that the underlying soil component is reduced to a thickness of one foot.

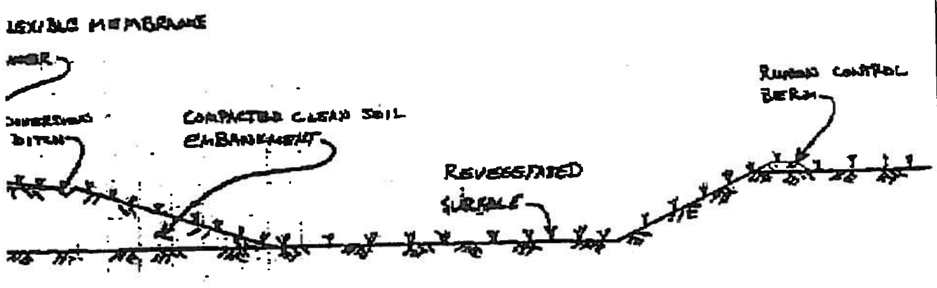
Final grading of the cap would provide for positive drainage to the perimeter drainage ditches shown on Figure 2. The final surface would have slopes of at least 3 percent, but no more then 5 percent, as shown in Figure 3.

Within the uncapped area of the lagoon, fill materials would be used that are capable of supporting a vegetative cover. The thickness of these soils would be sufficient to vegetative development and allow infiltration so that ponding does not occur.

Drainage System - An integral part of the final cap would be development of a defined surface water drainage network. This network would be comprised of drainage ditches and run-on control berms as shown on Figure 2. In general, the surface water collected, would be discharged to natural drainage in the ditch which runs between the lagoon and the railroad tracks. The configuration of the ditches would be developed based upon final elevations of the cap and the existing ditch profile.

As shown on Figures 1 and 2, the proposed approach would leave a slight depression within the uncapped area. Surface water would be routed away from this depression using the network of diversion ditches and run-on control berms. This would limit surface water accumulation to that represented by direct precipitation. Therefore, evapotranspiration and infiltration into the subsurface soils should be sufficient to limit potential ponding of free water.

MW:kp
BLB



POUNDMENT PROFILE
(NOT TO SCALE)

FIGURE 1
RANDALL TEXTRON
GRENADA, MISSISSIPPI

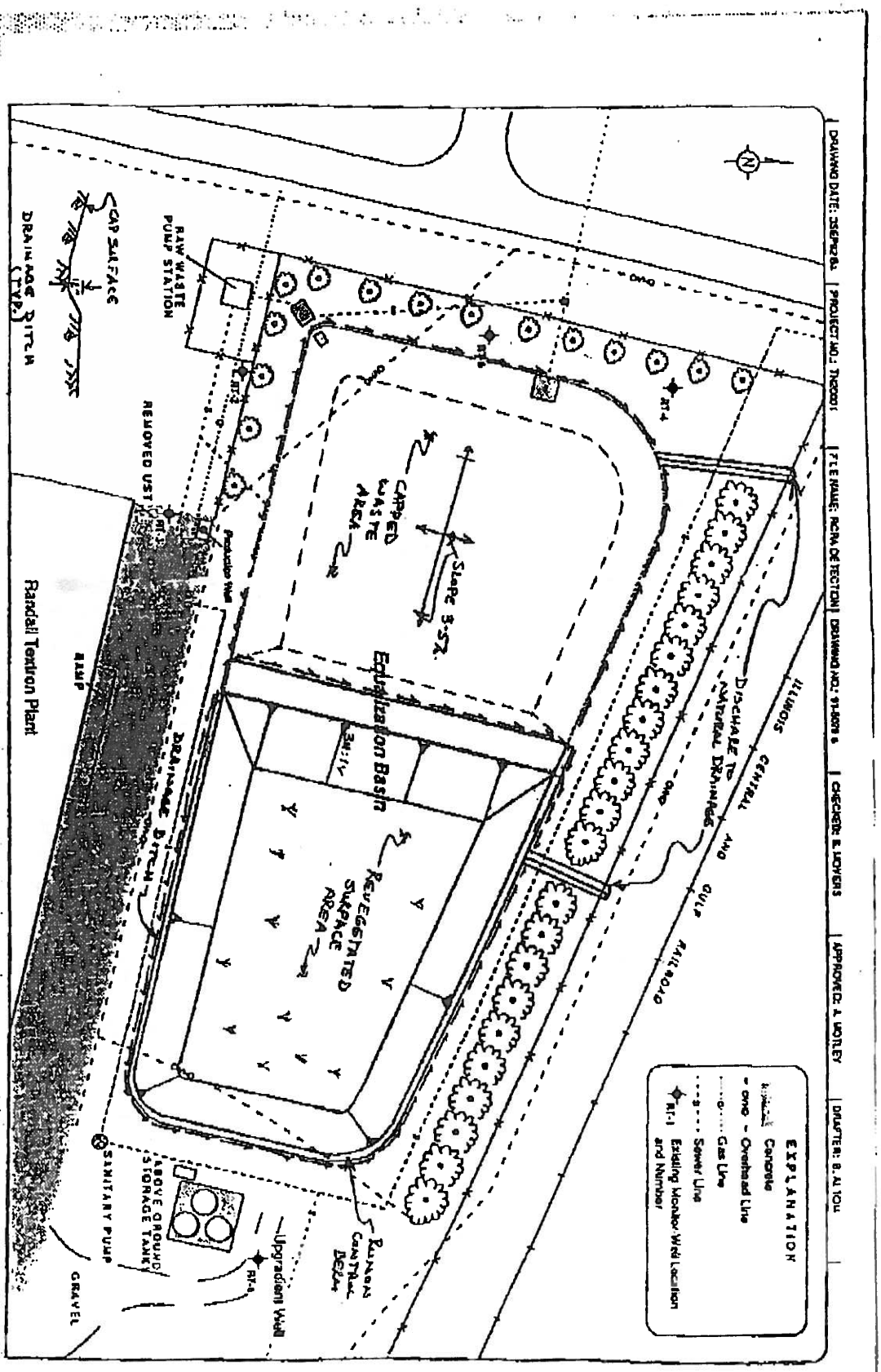


FIGURE 2
RANDALL TEXTRON
GRENADA, MISSISSIPPI

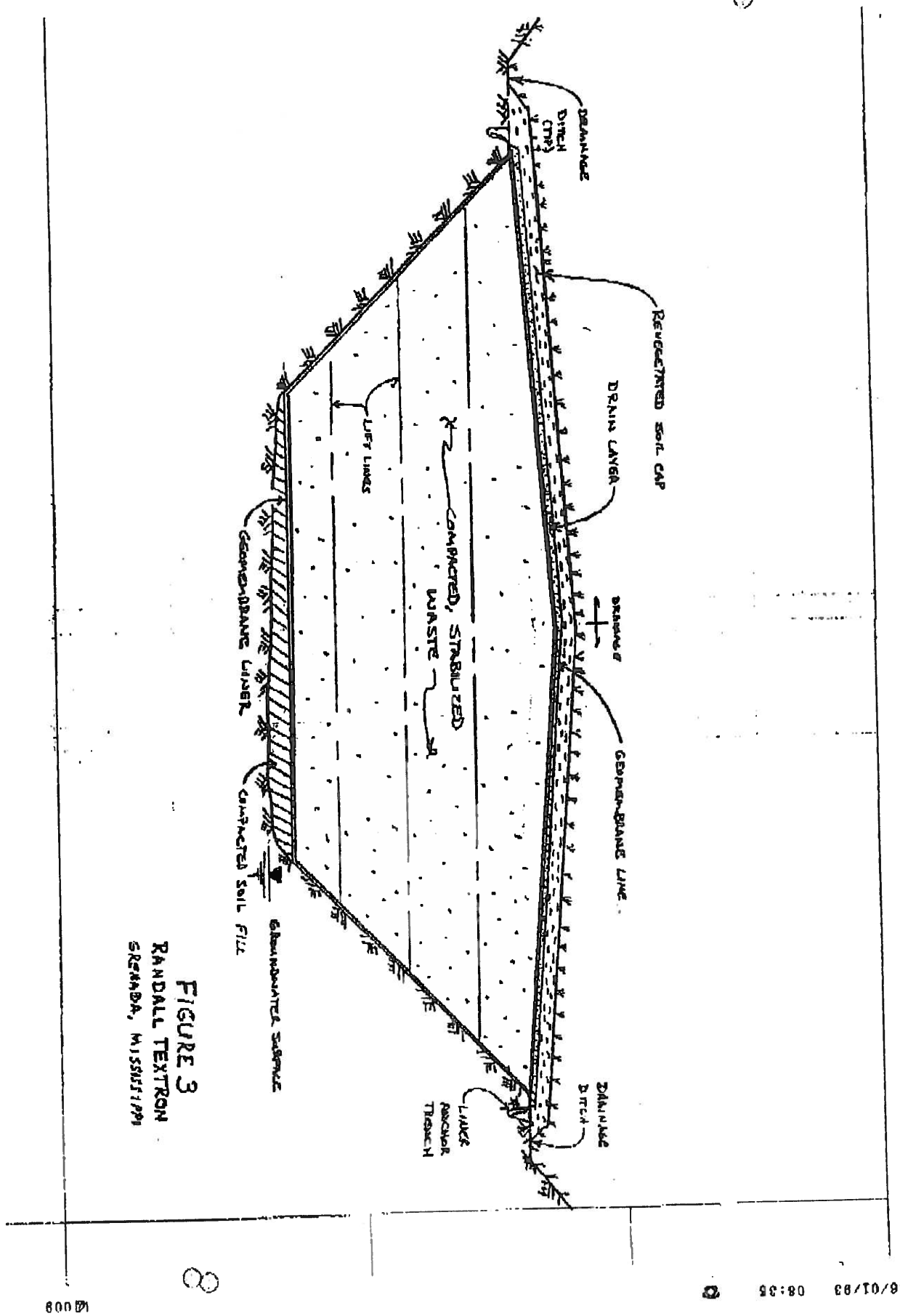


FIGURE 3
RANDALL TEXTRON
GRENADA, MISSISSIPPI